QUALITY STANDARDS
CANNED GRAPEFRUIT JUICE
—INCLUDING COLOR

FOOD INDUSTRIES

NOV 4 1939

NOVEMBER 1939

HOMES OF FAMOUS FOODS . . . BAKER'S CHOCOLATE, DORCHESTER, MASS.

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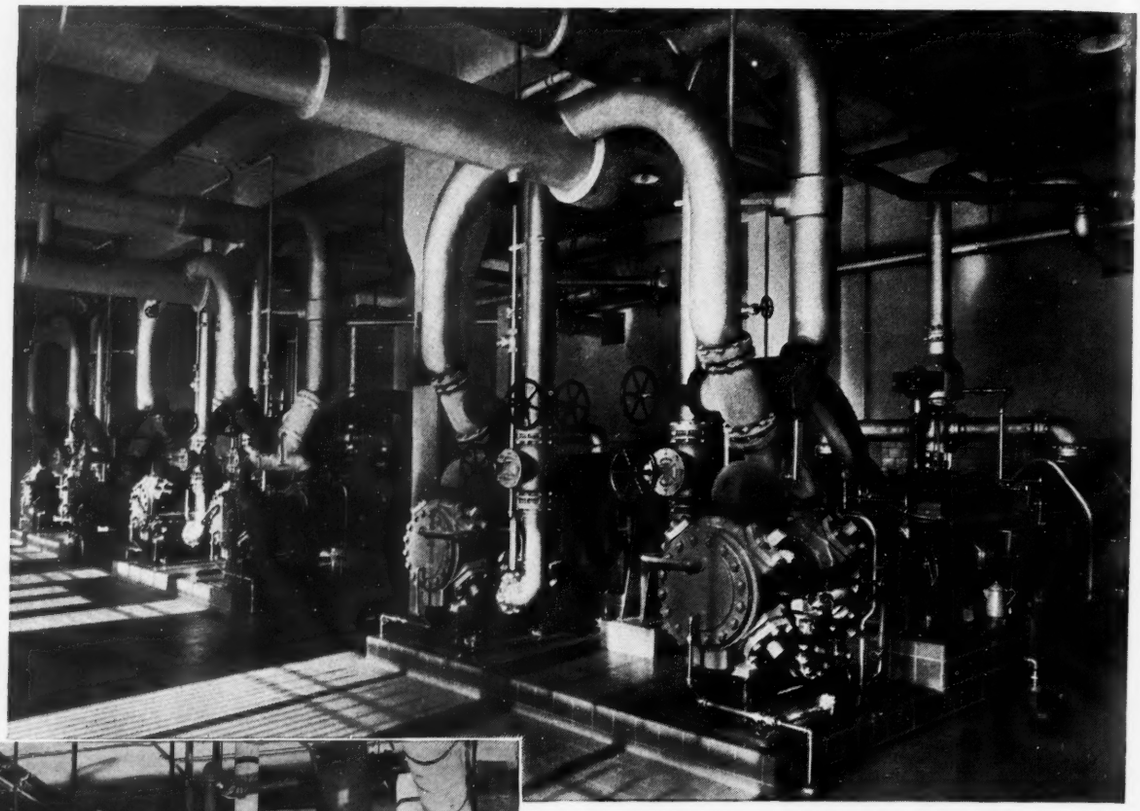
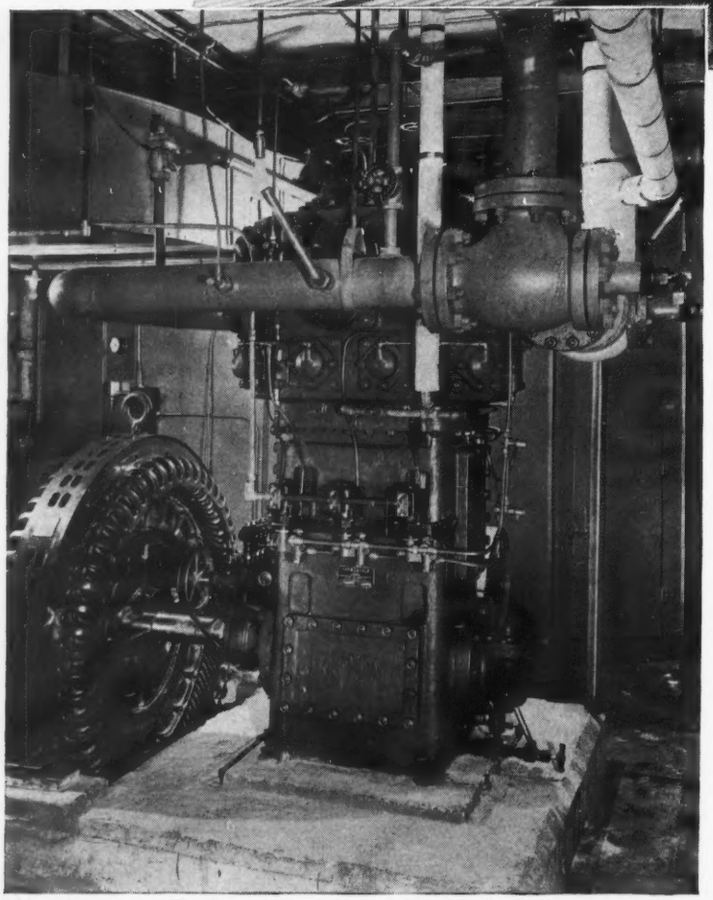
WORTHINGTON REFRIGERATION COMPRESSORS



Three Worthington-Carbondale horizontal duplex steam-driven ammonia compressors . . . capacity, 260 tons each . . . in the Stroh brewery, Detroit



Worthington-Carbondale vertical duplex double-acting "Freon-12" compressor . . . capacity 140 tons . . . in Brockelman Brothers' Market, Worcester, Massachusetts

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★HOMES OF FAMOUS FOODS

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In THIS *Issue*

• AFTER THE SHOW

With the New York World's Fair closed—until next Spring, anyway—the time has come to review at least some of the things this great exhibit meant to the food industries. This will serve to refresh the memories of those food men who had an opportunity to view the show and may help to bring some of the Fair's lessons to those who were unable to visit it.

So, on page 608 is presented an article—mostly pictures—on one aspect of the show—working food equipment. And when we say working, we have in mind that the Cocoa-Cola bottling exhibit bottled all of that beverage used at the Fair, that Swift's "hot dog assembly line" filled and smoked all of the delectable canines consumed by millions of Fair-goers, that Borden's "Rotolactor" supplied the milk for that company's restaurant and dairy bar, and so on. This equipment had to be good, to operate as show equipment and still do a continuous, daily production job. Also, it is typical of the kind of equipment going into the newest and best food plants.

• THAT RANCIDITY PROBLEM

Protection of fat in water emulsions from rancidity is a particularly difficult problem, because the finely divided fat prevents a relatively enormous surface upon which oxygen can act. Hence the results of a research by P. P. Gray and Irwin Stone, showing that *d*-glucoascorbic acid, a close relative of vitamin C, is an effective rancidity preventive in such emulsions as mayonnaise and butter, is of interest to all food manufacturers who deal with fat emulsions. The story is on page 626.

• STAMP PLAN WORKS

When the orange and blue stamp plan for the distribution of surplus foods was proposed last February, there were many doubts about its workability and also fears that it might interfere with normal food distribution channels. After six months' trial, now extending to seven cities, these doubts and fears are unrealized. On page 629 will be found an account of what the results to date have been.

• NOW DO YOUR PART

In the five most recent issues of FOOD INDUSTRIES we have presented the facts about the dangers to food manufacturers' businesses that lie in extending—or even continuing—existing barriers to interstate trade. The danger has been spotlighted, and its remedy—better public relations with farmers, legislators, railroads and others who foster trade barrier laws—has been pointed out. The situation is summed up on page 631.

In FORTHCOMING *Issues*

• COMES THE NEW YEAR

As our Hollywood friends might say. And with it comes what we hope will be a better and more useful FOOD INDUSTRIES, for our readers' delectation and profit.

Of course, we are not going to tell you everything that we plan for 1940. But some of our plans are far enough along to warrant taking you into our confidence.

First, there is the matter of flow sheets. Two years ago, in December, FOOD INDUSTRIES published a group of these, showing the equipment and processing sequences for a number of important food industries. Other flow sheets have appeared from time to time. And in 1940, in almost every issue, one or two new flow sheets will appear in color, printed so that they can be clipped for future reference.

Then, there is the matter of pickling. So little is available in the literature of the food industries on pickling, that we are glad to be able to continue the publication of W. G. Wormley's series on this subject. Eventually, we hope to give our readers the full fruit of Mr. Wormley's 40 years of operating experience in outstanding plants of the pickle industry. When completed, these articles will form an enduring text for the pickler.

Another feature of FOOD INDUSTRIES in 1940 will be new numbers in the series on "Unit Operations of Food Engineering." Colleges and universities throughout the country are recognizing the growing importance of the food engineer by installing courses for his training. But as yet, little or nothing is available in the way of a literature of food engineering. So these unit operation articles serve the double purpose of being useful to those who are now engaged in engineering work in food plants and instructing those who will carry on the more highly technical operations of the food "World of Tomorrow."

Finally, FOOD INDUSTRIES will continue to print the Agricultural Marketing Service's Standards for Quality Grades, including true reproductions of the color standards, as fast as these appear.

• AND A REMINDER

Don't forget that FOOD INDUSTRIES for December will have a preview of the Chemical and Process Industries Exhibition, and a special study of the equipment and methods available for drying foods.

FOOD INDUSTRIES

DISTRIBUTION • PROCESSING

Established 1928 — McGraw-Hill Publishing Company, Inc.

LAURENCE V. BURTON, Editor

Volume 11, Number 11 November 1939

The Talk of the Industry

» PITY the discomfiture of attorneys for the Corn Industries Research Foundation in their fight to obtain regulations under the new food law that will permit dextrose to be used as sugar in foods and not require a specific label declaration. After months of hearings in the battle of sugar, beginning January, 1939, and to extend into the remote future, after days and weeks of testimony to show that dextrose is sugar and is nutritious, and that its use is not economic deception, that dextrose has technical merits not to be found in other sugars, that it is unfair to seemingly stigmatize it by requiring a label declaration of its presence—after all this, a two-page ad from Corn Products Refining Company's 1939 Fall campaign was introduced as government evidence in

the hearing on jams, jellies and preserves. It contains this statement:

"The inclusion of dextrose as an ingredient of a processed food—*and the featuring of this fact on the label*—provide the manufacturer with a sales argument and an advertising appeal which captures public preference." (The italics are **not** ours—Ed.)

It sometimes happens in the best regulated families—and corporations.

» CONGRESSMAN BRUCE BARTON told the United States Brewers Association that historian Prof. Charles A. Beard summed up his lifetime study of knowledge of human history in these four sentences:

"The bee fertilizes the flower it robs.
The mills of the Gods grind exceedingly fine.
The stars shine in the night.
Him whom the Gods would destroy, they first make mad."

» FOUR YEARS AGO a prominent food technologist set out to solve the problem of canning Atlantic crab meat. The biggest difficulty he had to overcome was darkening of the meat. It took a whale of a lot of pure scientific research and the evaluation of many practical angles to lick the problem. But he licked it. Now a new food industry has been born. Yes, research pays off—when patience and perseverance are its bodyguards.

» THE 1939 New York World's Fair has come to a close. The 1940 edition is in the making. Some of the successful food exhibits will be repeated next year. Others not so strong in their popular appeal will die the early death of the weakling. Inspired by the successes and enlightened by the failures, food manufacturers not represented at the 1939 Fair will have exhibits next year. These newcomers ought to plan their exhibits now, while the memory is fresh as to what types of public-relations-oil make a food exhibit tick and what types gum up the works.

» WHAT THIS COUNTRY NEEDS is a good gas mask that will keep the fumes of foreign propaganda from going to our heads.

» SPEAKING OF RESEARCH, the poultry products industry has recently begun to do some organized looking on its own account. It has stopped and listened at the crossing long enough. Leaders in the industry have labored through the machinery of the Institute of American Poultry Industries to wet nurse this $1,200,000,000 infant into a healthful state. But now, these leaders realize the need of fundamental data and below-the-surface information if the industry is to shed its swaddling clothes and begin to progress on its own legs.

Under the banner of an Associate Professorship in the Department of Poultry Husbandry at Iowa State College, the Research Committee of the I.A.P.I. has set up the first Department of Poultry Products Research at an educational institution. Supported by poultry industry funds for the present, Dr. George F. Stewart, formerly

in charge of research with Omaha Storage Co., has begun the study of the fattening, killing, and dressing problems of the poultry killing stations, of the properties and industrial uses of egg whites, and of the possible industrial uses for such waste products as egg shells, feathers, and offal.

Institute meetings, fact-finding conferences, and individual company research studies have played their part in the past with such benefits as come to an industry as a result of decentralized efforts. But, headway was being made slowly and with much waste motion in the solution of the industry's problems.

Under the new program, concentrated and coordinated effort is being directed toward the study of the chemical, physical, and even the mechanical factors affecting the quality level and the economics of poultry products.

It is a program that can well be studied and considered by other relatively young or small industries whose materials for processing come from widely scattered and indifferently operated agricultural sources as products of side or cash crop activities.

Have You Joined?

FOOD men are again reminded of the Institute of Food Technologists. That new organization is going to afford our major opportunity as technical men for exchanging scientific and engineering information. There we shall meet chemists, biologists, bacteriologists, engineers and those who represent various other –ologies. There each division of the food business will be able to trade its successful experiences for the advice and help of many other divisions whose problems are similar.

There is no doubt as to the prospective success of the Institute. Those who want to profit by it, attend its meetings, and make themselves more successful and more valuable to their own companies, will not neglect the present opportunity for membership. Dr. George Hucker, Geneva, N. Y. is secretary.

How Would You Like to Answer These Questions?

BE THANKFUL that you are not responsible for planning some branch of activities in a country where the whole economic set-up is managed by a central government. Read the following letter from an important Russian official who obviously is crying for help. Then visualize the problem of planning an entire industry for centralized control.

Capitalism with all its faults appears to be more likely to give the people what they want at a reasonable price than a centrally managed economy. A further cheerful thought to retain is that economic planners in Russia who make mistakes are usually liquidated (i.e. executed).

Dear —:

In my further study about the American food industries, I am very interested in the questions of New York City supply with bread and baked goods and, namely:

1. Baking industry of New York City: volume of the industry, type and size of plants (mechanized and hand-craft shops), number of employees and workers, the dimensions of production.
2. The organization of bread transportation in baking plants and groceries: kinds of transportation (motor trucks, horses), types of containers for bread and baked goods transportation, radius of delivery.
3. Types of products in New York City's baking industry and the problem of specialization of baking plants and groceries, time of bread marketing in specialized and unspecialized groceries and other retail outlets and the delivery of production from baking plants to groceries by hours (during the day, evening and night delivery of bread and baked goods), types of products of New York City's baking industry for restaurants, hotels, etc., shifts in baking plants and the distribution of diverse products, manufacture by shifts.
4. The organization of control of bread and baked goods quality in New York City: sanitary and hygienic conditions in a big baking plant (especially the questions of containers disinfection), the system of giving orders by groceries and other retail outlets on baking plants, the conditions of return of unsold bread and baked goods, production back from groceries to the baking industry.
5. Analysis of the cost of bread and baked goods production in New York City's baking industry (the general schedule of costs and the cost of production for most important types of products).
6. Seasonal problem and the capacity of New York City's baking industry.
7. The organization of bread and baked goods distribution in New York City: the distribution of groceries and other retail outlets throughout the city (according to distribution of population in boroughs and districts of New York City).
8. Volume and structure of bread and baked goods consumption in New York City; total and per capita consumption, types of consumed products (bread, cakes, etc.).
9. Legislation and control in New York City's baking industry.

I hope that you will send me, as soon as possible, all the available materials and information about the overmentioned questions.

Very truly yours,

Hors d'Oeuvres

• *Wilson & Co. publishes free lost ads for Chicagoans whose dogs have strayed. Here's the first company to take the attitude "love you love your dog" toward consumers.*

• For a small charge, purchasers of "Hearts Delight" flour in San Antonio recently received a blanket. Well, this premium might or might not represent the brand name, depending on who is under it.

• *Wars should be fought with the weapons of an old fashioned Halloween. Think what a barrage of overripe tomatoes would do to a troop concentration and how quickly a shower of rotten eggs from bombers would evacuate a city.*

• During the Revolutionary War, the butchers in Colonial New York were organized into a military unit, Captain Stake's Troup of Light Dragoons. This unit distinguished itself during the various Indian wars and especially during the War of 1812. For close-in fighting, we'd put our money on a meat cleaver any day.

• *After 1830, Cincinnati was named "Porkopolis," having perfected the system which packs fifteen bushels of corn into a pig and then packs that pig into a barrel and sends him over the mountains and over the ocean to feed mankind.*

• Something out of a brewery inspired Francis Scott Key to write the Star Spangled Banner. An American flag so big that it had to be sewed together on a brewhouse malting floor flew Baltimore's defiance for the British when they moved against Fort McHenry. Seeing the flag through the night by light of bursting shells, the famous poet was moved to write. His modest little poem was destined to become the National Anthem.

• *Two new products we'd like to see on the market: corn bread mix and canned corn meal mush. Must be that we're old fashioned.*

• Domestic rabbit production has commenced to take on the appearance of an industry. A federal survey indicates that already bunny production in the Los Angeles area is one-sixth that of poultry. Veritably, the hare raising curve is standing on end.

• *Beer brewed from the formula of George Washington was served on Brewing Industry Day at the New York World's Fair. Perhaps we shouldn't say that it was better than most commercial beers made today after a century and a half of progress. But George was more than a great statesman, soldier, farmer, surveyor and ladies man. He had an excellent taste for beer.*

• In the days when streets were unpaved and garbage was tossed out the front window, pigs were permitted to roam the streets of New York City as garbage collectors. On one occasion, WPA writers report, a herd of these porkers invaded a brewery, almost wrecked the building, ate the mash and got gloriously inebriated. One of the pickled pigs attacked a horse at a nearby hitching post. And that's what it means to get hog drunk.

F.K.L.

Weather Reports—A War Casualty

IF the United States daily weather map looks a bit ragged or even "sketchy" at the Canadian border, lay it to the war. And if weather forecasts lose some of their previous degree of accuracy, lay it to the same cause. The reason is that, in war time, belligerent nations refuse to give out any meteorological data until it is too old to serve as a flying weather forecast for bombers.

During the first World War this precaution against easy air raids forced Scandinavian countries to find other methods of forecasting and led to the discovery of the "cold front" theory of weather predicting. Here the war-time restrictions ultimately served a useful purpose.

While Canada's withholding of current weather data may seem to be only of academic interest, it may be very serious to food manufacturers. For, if the restrictions continue, it will not be possible to give very much advance warning of impending cold waves unless the U. S. Weather Bureau should, like Norway in 1914–1918, discover a better substitute for the missing Canadian reports.

Food Technology Would Avoid This

HERE is a case where management has gone haywire, after securing the benefits of an advance in food technology. For diplomatic reasons, names and products are omitted. A distributor with a large manufacturing department took on a new process which had been developed by an outside concern. It cost real money. The product is one which deteriorates rapidly in contact with air.

Commonsense would dictate packaging in an air-tight container, either in vacuum or an inert gas. But the manufacturing department, for reasons as yet unexplained, is packing the product loosely in cellophane bags with plenty of air left in. Big question is—Why spend money for a new process of manufacturing and then leave the product vulnerable to attack by oxygen? This is not a good food technology—in fact, it is very bad.

Management has its own job to do in securing the benefits of the best food technology in its plant. This job is equal in its importance to the proper training for the technologist. Management must not only engage the services of qualified men but it must also *utilize* their services, put them to work and follow their guidance.

Ignorance Will Not Be Bliss

THREE conclusions must come to any well informed persons who read through the current Notices of Judgment, Food and Drug Administration—that unsavory record of government actions against offending foods and food manufacturers.

1. Many concerns must be either lacking in food technologists or control laboratories, or else the latter are not permitted to exercise the proper authority to keep the companies out of trouble.

2. Many concerns must be lacking in knowledge of food fumigation and the proper protection of foods from further insect infestations by adequate packages.

3. Many concerns must be lacking in knowledge of the newer laboratory technics that enable the microscopist unerringly to detect the presence of all manner of unpleasant foreign material in food—matter, like rodent hairs, that hitherto has escaped all detection.

May we urge upon all food manufacturers that the industry is now operating under a new food law that has teeth. Lack of adequate quality control, lack of competent food technologists, or just plain ignorance of what you are up against, or of how to avoid difficulties, will get you into just as much trouble as if you had willfully decided to embark on a career of adulteration, deception and fraud.

The remedy is clear. Make up your mind that competent food technologists are just as much needed in your organization as bookkeepers, superintendents, master mechanics, and salesmanagers. And it's usually a whole lot cheaper to employ such preventive measures than to pay lawyers' fees and court costs, to say nothing of loss of product and prestige.

Export Troubles Expected

MANY food manufacturers claim that they are not interested in new opportunities for sale of their goods for export. This is more than a mere front or pretense. And for a large majority of food makers it is probably a wise position to take.

If and when Congress so decides (and we can only guess when at the time of writing), we shall sell to combatant nations on a "cash-and-carry" or "cafeteria" self-service basis. The combatant governments and their representatives will be able to purchase right here in the United States on a basis not essentially different than any large domestic buyer. Food manufacturers know how to deal with such folks. They will get the money promptly, and the purchaser alone will have the problem of transport to deal with. The major novelty will probably be that of export packaging in suitable outer containers for handling to and aboard ship. When manufacturers can deal with such folks without breaking up their domestic distribution system, they might well do so.

Dealing with *neutral* nations or firms of such countries will involve more complication than dealing with emissaries of belligerents! These neutral folks will want credit, often times long-term credit. They will welcome deliveries at their home ports. Food manufacturers will do well to scrutinize both of these details with great care before they strike a bargain. The credit machinery of many neutral nations is badly upset. Transport anywhere in the world by water is going to be a serious problem. Only those who have previously been in the export business should venture into these projects under present conditions without getting skilled and up-to-date advice.

Those who expect to sell to British dominions, or will need to ship in British ships to neutral nations will not overlook the British "Black List." If a concern does business with anyone on the "Black List" there is no chance to do business anywhere with Britain or ship in British ships. (Important for large firms with many branches in other countries.)

It is to be hoped that American food manufacturers can increase their total business by selling to nations needing our products, whether belligerent or neutral. It is even to be hoped that such sales will set up a prestige abroad for many American brands and goods. But there is a fine chance to lose money, as well as opportunity for profit, in such dealings. The greatest care and skill is obviously needed by newcomers in the export business.

We Are For Preparedness

PREPAREDNESS for the worst that may come is less costly than failure to be ready. In fact, nothing is so costly as failure. If FOOD INDUSTRIES takes an active stand for military and economic preparedness against potential or future foreign enemies, it is because this department can never forget the 1917 mess. Washington was pandemonium in that summer. Many times it was far quicker to walk ten blocks to ask a question than to wait for a telephone line that was not busy.

All the big shots of industry seemed

to be there. We ourselves spent some time on the Committee on Supplies of the Council of National Defense where there were concentrated more high-powered executives than we have seen together before or since. Able and willing though they were, their accomplishments for months were practically nothing. Why? No plan, no authority, no responsibility.

Then the War Industries Board began to function. Somehow, order slowly emerged from chaos. But precious months were lost. We were just plain lucky to get through as well as we did.

If anything is apparent in this 1939 war during its first few weeks, it is the accelerated speed with which events occur. And the lesson we must learn is, that if anything goes haywire, we as a Nation and as men in industry must be ready to act with unbelievable rapidity.

Preparedness is expensive, but failure to prepare would be disastrous. And preparedness is an effective weapon with which to protect ourselves against being dragged into the European catastrophe.

The Cart Before the Horse

PICTURE the hearing on standards of identity for jams, jellies and preserves. It's a small room for a hearing. Rather plain, too, for Agriculture can't afford the elegance of the Department of Labor. At one end of the room is a flock of plain wooden-top kitchen tables arranged in a rectangle to imitate a big directors table. Near this table is a little platform about ten inches high and about a yard square. On it is an uncomfortable classroom armchair where each witness sits. In the back of the room are about a dozen rows of similar classroom armchairs for some sixty spectators and "interested parties."

At the imitation directors table sit the presiding officer, the official stenographer, and others. Who are those important looking gentlemen who also sit there? Well, one of them is attorney for the American Cane Sugar Refiners Association and United States Beet Sugar Refiners Association. Another is attorney for Refined Syrups, Inc. Over there are three attorneys for the Corn Industries Research Foundation. Opposite to them sits the attorney for the Food and Drug Administration. Sometimes there are two of them. At the foot of the table in the least conspicuous place of all is Daniel R. Forbes, attorney for National Preservers Association.

Your surmise is probably correct. The name of the hearing *is* a bit misleading, for jams, jellies and preserves merely furnish another battleground for the high powered legal talent representing manufacturers of the various kinds of sugars. Previous battlegrounds have been the hearings on catsup, sweetened condensed milk and canned fruits at which the sugar attorneys introduced the same sort of evidence and made the same sort of cross-examinations.

If you give a little thought to it, you can predict the battles of the future where this costly traveling show will put on other pitched battles—ice cream, sherbet, candy, bread, cake, biscuits, pickles, sirups, flavoring sirups, mincemeat, pie fillings, prepared dessert powders, carbonated beverages, still beverages, fruit juices, canned vegetables—but why go on? The list includes every food in which sugar is an ingredient.

Hearings Become Complex

And as the hearings progress with all the tedious slowness of the famous case of Jarndyce and Jarndyce in Dickens' "Bleak House," the foods become more and more complex mixtures, with more and more technical problems.

Jams, jellies and preserves (fruit butters had to be postponed) required two whole weeks for testimony. And for what reason? Simply because the government failed to call its first hearings on the simple ingredients and get them standardized first, before proceeding to complex mixtures. For this reason the sugar battle will crop up in every hearing where sugar is a food ingredient. When pickles come up for a hearing it will be incumbent on all sorts of sugar manufacturers to be represented because there is no standard of identity of sugar. It is also likely that another battle will be fought out here to decide on what is vinegar, spices, and even salt. All because the government has put the cart before the horse and is seemingly determined to settle the complex questions before establishing the standards of identity of the simpler foods and food ingredients.

To industry, the government's policy does not make sense. And until the order of events is rationalized, the attorneys for the companies making the as yet unstandardized ingredients will far outnumber the combined number of attorneys for the government and the industry actually most concerned in the hearing. It would be only ridiculous, were it not also so costly and so serious for food manufacturers.

In the opinion of FOOD INDUSTRIES, the government should about face on its policy and handle first things first. Under the present system of procedure the government is open to the charge of deliberately choosing an illogical course in holding the hearings for some undisclosed ulterior purpose.

Effects of European War On the Food Industry

BY this time, it is possible to summarize the effect of European war on the food industries of the United States. Up to now, there have been no huge war orders. A very modest increase in food exports has occurred, but these are purely commercial transactions and do not originate with foreign war departments. Strangely enough, frozen fish has become an item of export, for there is no fishing in the North Sea at the present time.

Great Britain has removed all quota restrictions on ham and bacon from the United States. But she plans to buy food as much as possible from her own Dominions and expects to buy from other places that are traditional sources, like Argentina.

Important point to remember is that belligerents are much more self-sufficient than in the past. Also that the big demand for foods in the U. S. during the war of 1914–1918 did not occur until after we got into it in 1917. Also that foreign exchange rates are very unfavorable to exports from the United States, that shipping space will be hard to get, and finally that Britain is establishing maximum prices that at present are not profitable to U. S. manufacturers.

Nevertheless, food manufacturers stand to profit by the present war because of the increase in prices and the consequent improvement of profit margins that normally are microscopic.

The buyers' market has become a sellers' market. Many small and intermediate size concerns tell us that they are operating at satisfactory profits since September. The only explanation is that in war time people seem to expect to pay more than in peace time.

It is certain that the United States will experience a definite improvement in domestic and export business on products other than foods because of curtailment of European exports to the Western Hemisphere. Indirectly, the food industry will benefit from this transitory improvement as a result of war, through the more satisfactory profits obtainable on our normal domestic food consumption.

War Should Strengthen Domestic Food Market

Food Trade with Belligerents

In 1914, England and France were plunged into war without preparation and without time to anticipate war needs. For more than a year prior to the present conflict, both countries have been accumulating supplies of everything essential to a warring nation.

During the World War, France was almost self-sufficient. France, with the aid of her colonies, in war or peace is now capable of feeding her people without aid from neutrals. England, since the last war, has reached a self-sufficiency almost equal to that of France. From her colonies, England can and will obtain almost her entire food requirements.

If the present war is of long duration the present situation may be altered. Pressure for munitions and industrial equipment may absorb the labor normally employed in food processing, both in Europe and in the belligerents' colonies. At such a time, the United States may be the source of supply of a considerable volume of processed foods.

It should be remembered that most of the increased production demands placed on food manufacturers in the United States during the World War did not start until 1917, when the United States entered the war as a belligerent.

At the present and probably for some time to come, the exchange between the United States and the belligerents is unfavorable to the belligerents. Therefore the belligerents will buy from the United States only those food products which cannot be obtained from colonies, or neutrals which afford belligerents a satisfactory exchange. This promises to be little, if any in the immediate future.

Trade with Neutrals

There is possibly more hope for increased United States food trade with neutrals than with belligerents. However, these gains may not offset losses of food trade with belligerents. Germany's trade with South America is temporarily at an end. However, it is improbable that United States food trade with South America will more than balance the loss of Germany's food purchases from this country. South American countries are food exporting countries, producing a surplus above consumption requirements.

The United States can expect little if any increase in food trade with European neutrals, even though willing to assume the risk of the trade. United States food manufacturers may obtain a portion of the food trade which Spain, Portugal, Italy and a few of the Mediterranean countries previously carried on with the British Empire. Increased food trade with North European neutrals cannot be expected soon nor be depended on.

The one group of food products which may experience an appreciably increased export demand is the seafood group. European fishing is certain to be curtailed. United States fishery products may supply most of the deficiency.

Domestic Food Trade

Although the possibility of increased food product exports from this country is slender, the probability of exports of raw industrial materials and manufactured products other than foods is excellent. Belligerents will purchase from the United States as much as United States laws, shipping hazards and the belligerent purchasing power permits. Belligerent exports of raw materials and manufactured products to neutrals will diminish, leaving the market for these products among neutrals open to United States exporting.

An increased export market for raw materials and manufactured products other than food will increase employment and raise wages. This will increase the domestic expenditure for food.

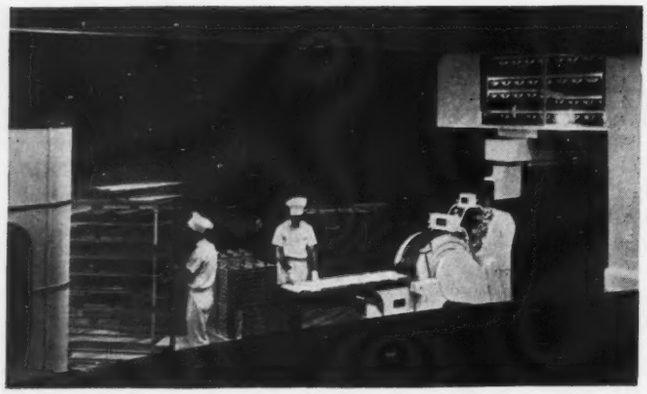
It is a demonstrated fact that especially families in the low income brackets (below $2,000 per year) increase the family expenditure for food almost proportionately with increased income (see table). As the family expenditure for food increases, a greater portion of the food budget goes for manufactured and processed food. Also, an increased demand for manufactured foods is accompanied by an increased demand for quality grades. The price spread then widens to permit a better profit to the manufacturer.

Already food products are indicating a tendency to attain a price structure which will permit food manufacturers again to get into the black. Food manufacturers for some time to come will find the domestic market the important and profitable market. Export markets involve hazards and risks. Export food markets may be transient, lasting only for the duration of the conflict. The domestic market can be permanently defended against any important volume of foods processed abroad.

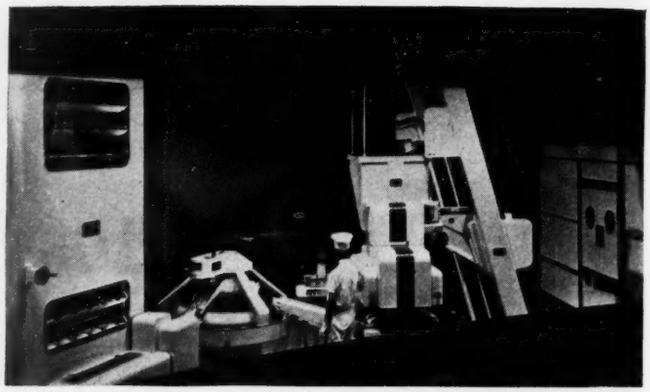
Average Annual Expense for Food, 1935-1936*

Family income class	White families		
	New York	Providence, R. I.	Portland, Ore.
$500 and under 750	$432	$316	$293
750 and under 1,000	440	361	367
1,000 and under 1,250	481	436	388
1,250 and under 1,500	570	519	437
1,500 and under 1,750	629	569	454
1,750 and under 2,000	668	605	504
2,000 and under 2,250	779	670	564

* Statistics compiled from U. S. Bureau of Labor Statistics.



1D—Dough is discharged from the proof box directly into a molder which forms it into rolls. Two of the rolls are twisted together and put into a pan to form a loaf. Racks of panned dough are pushed into a proof room. Equipment—Baker Perkins.



1C—Troughs of dough from the fermenting room are elevated and dumped into the hopper of divider. The pieces of dough are conveyed directly to a rounder that kneads the dough and closes the "pores." From the rounder the dough passes into the traveling trays of a proof box, where it gets a 12 minute "rest" at room temperature and humidity. Equipment—Baker Perkins.

1E—After being put into the pans, the dough gets its final raising in proof room at right. Here it remains 50 to 60 minutes at 98 deg. F. and a relative humidity of 96 per cent, this temperature and humidity being maintained by an air-conditioning system similar to that in the fermenting room. From the proof room the dough goes to a gas-fired tray oven of the "diathermatic" type. It is baked for 36 minutes at 480 deg. F., the temperature being automatically controlled. Equipment—Baker Perkins and Union Steel Products Co.

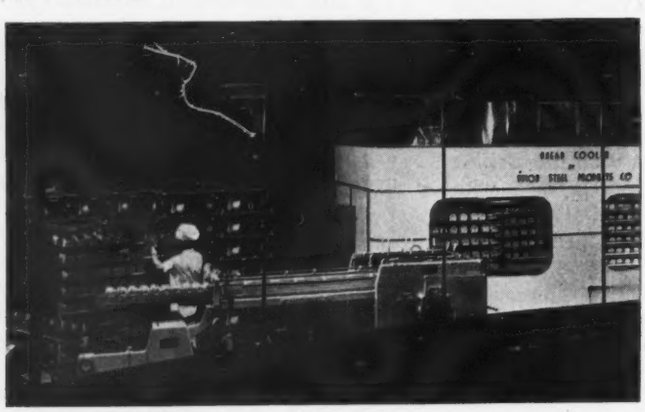
FOOD PROCESSING *at World's Fair*

Latest machines and methods in baking, meat packing, milk, ice cream, cheese, bottling and coffee roasting plants

NO food industry exposition ever held had as much of interest to practical men as did the World's Fair which just closed in New York. For at the Fair were not individual, disconnected pieces of equipment for one industry, but complete processing and packaging plants in actual operation, and these were in several industries. This gave the operating man an opportunity to see not only up-to-the-minute equipment and methods in his own industry but a chance to study modern methods in other food industries from which he could borrow some ideas.

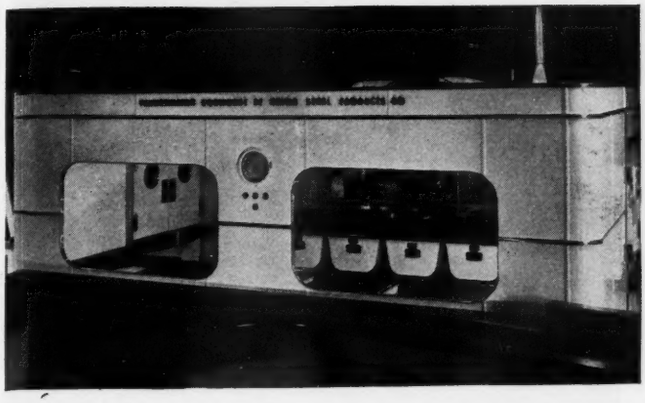
So for the benefit of those too busy or too far away to get to the Fair, food processing plants at the big 1939 show are here illustrated and described.

Perhaps it should be pointed out that the equipment and practices are identical with what is found in the most modern plants, except for a bit of exterior streamlining here and there. No untried and unproven practices were employed. The show had to go on day after day in view of consumers, so the plants had to be dependable.

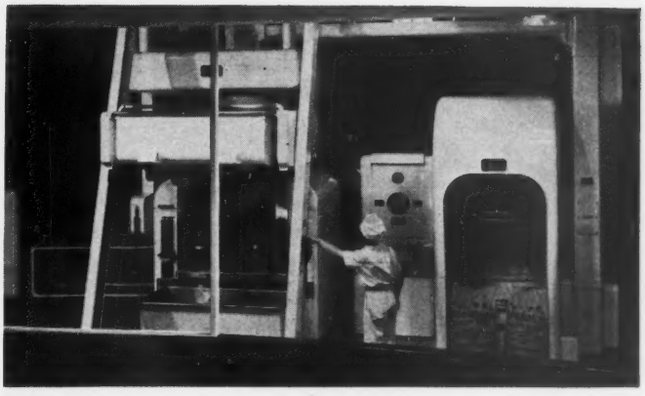


1F—After baking, the bread is put on trucks which are pushed into the cooling room. There the bread remains for 90 minutes at 78 deg. F. and a relative humidity of about 95 per cent. The cooler is air conditioned by a unit like that in the fermenting room. When cool, the loaves are sliced and packaged in a heat-sealed, double, waxed-paper wrapper and are ready for delivery. The wrapping room is kept at 82 deg. F. Equipment—by Union Steel Products and Baker Perkins.

1G—More than 2,000 dozen cup cakes were baked a day at the Fair in the Hostess Cake bakery of Continental Baking Corp. The flour is discharged from a portable sifter and blender directly into the bowls of two mixers. A scaler measures the dough into pans which are put into a gas-fired reel oven. Baking is at 390 deg. F. for 15 minutes, with automatic temperature control. Taken from the oven, the cakes are set on a belt conveyor on which they travel back and forth while cooling. Next, the cakes are conveyed under an icing depositor and again they move on a conveyor until the icing sets. Then they arrive at a wrapping machine to be encased, two at a time, in transparent cellulose wrapping. Equipment—Tri-Une portable blender and sifter, Glen mixers, Kotten scaler and icing depositor, Package Machinery Co. wrapping machine, American Machine and Foundry Co. oven, Langendorf conveyors.



1B—Air-conditioned fermenting room where sponge dough is kept for five hours at 80 deg. F. and 78 per cent relative humidity. Then the dough is mixed again and put back into the fermenting room for another hour. The air-conditioning equipment, which may be seen through the window at right, washes the air in a water spray and passes it over steam and ice water coils to give it the correct temperature and humidity. Equipment—Union Steel Products Co., Albion, Mich.



1A—Here's where the bread begins to take form in the Wonder Bakery operated by Continental Baking Corp., New York, a plant with a capacity of 5,000 to 6,000 loaves of 18 oz. each, per 12 hours. Blended in the machine at the right, the flour is elevated; passed through an overhead sifter and into the automatic weigh hopper over the mixer at the left. The hopper discharges the correct weight of flour for a batch of sponge dough, while the right amount of water at the correct temperature is metered into the mixer by the thermostat-equipped flow meter located between sifter and mixer. After five minutes of mixing the sponge dough is dumped into a stainless steel trough and taken to the fermenting room. Fermented sponge dough is dumped into the mixer by elevating the dough trough over the machine. Equipment—Baker Perkins Co., Saginaw, Mich.

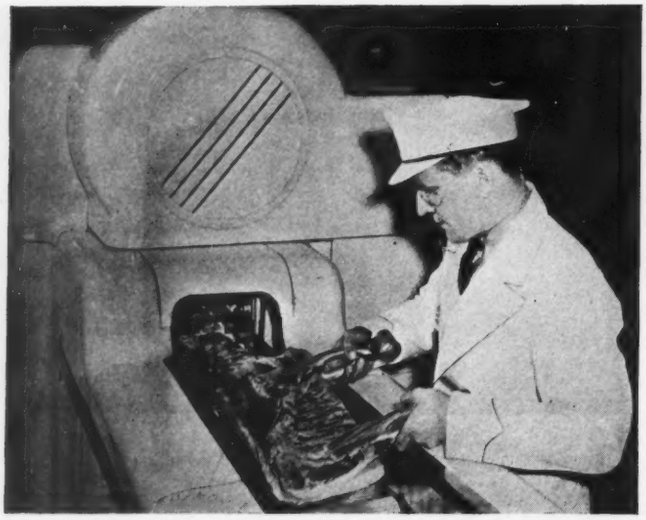
2A—Some new practical plant practices were embodied in the frankfurter "kitchen" of the Swift & Co. exhibit. Meat is taken to the grinder (left) on a stainless steel belt, and from the grinder to the cutter on another such belt. The cutter, behind conveyor at center, discharges directly into the stuffer, at right of conveyor. All manual handling is eliminated. Four thousand pounds of frankfurters was produced daily. Equipment—Cincinnati Butchers Supply Co. and (conveyors) Sandvik Steel, Inc., New York.

2C—After stuffing, the frankfurters are linked by attractive uniformed girls working at a stainless steel table. The linked and looped franks are placed on a trolley which travels on an overhead rail to the curing, smoking, cooking, cooling and packaging operations.

2B—A revolving pan-shaped disk discharges the meat from the cutter bowl into the sausage stuffer at the Swift exhibit, the meat having been chopped fine and mixed with seasoning in the cutter. The old method of transferring meat from the cutter to the stuffer in a packing plant involved transport in a hand truck.

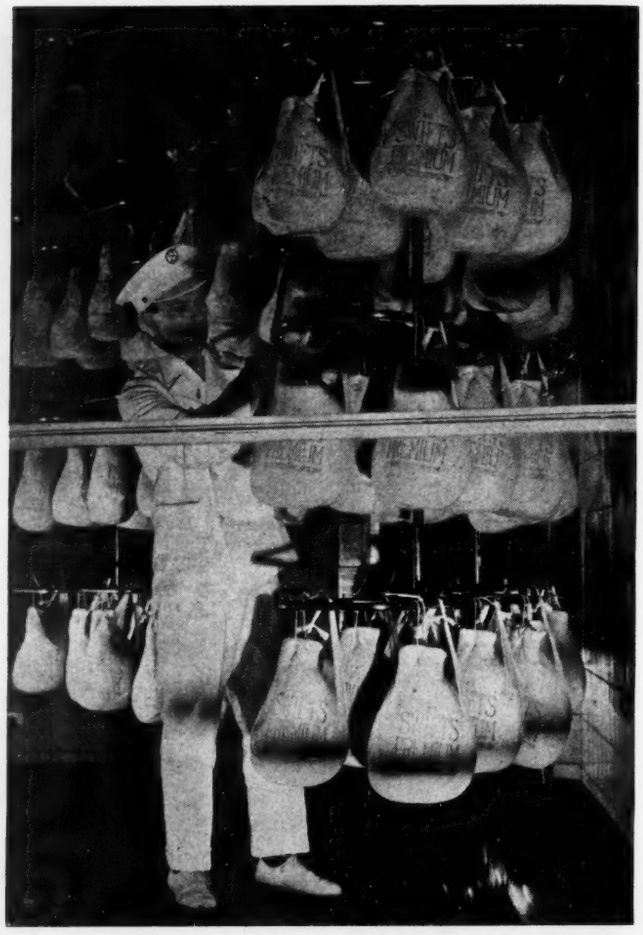
▶ ***Since it illustrates and describes equipment and operations of the type being adopted in modern plants of several food industries, this article is of value to***

All food executives, technologists and engineers



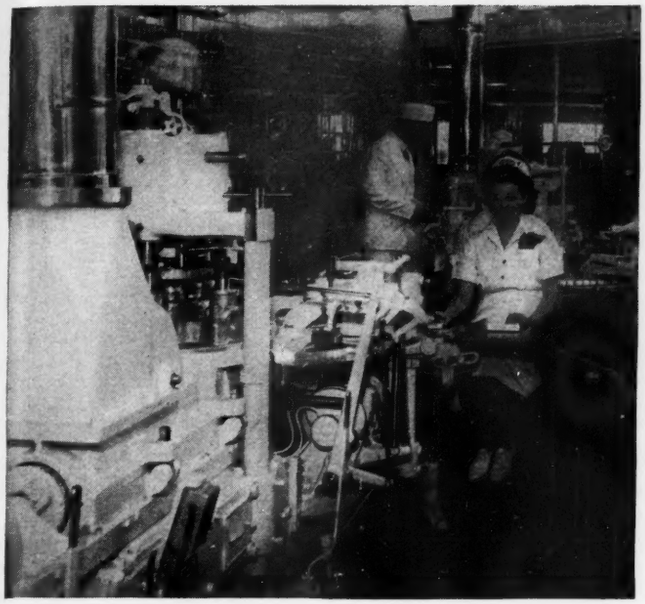
2D—Metal tongs, not hands, feed bacon into streamlined slicing machine at Swift exhibit. Of Swift's own design and construction, the slicer bunches the slices automatically on a stainless steel conveyor that carries them to girls who do the packaging.

2E—Seven thousand pounds of bacon was sliced and packaged daily at the Fair in the Swift exhibit. Bacon from slicer in rear is brought to girls on conveyor, the girls weighing out correct amount and wrapping it. The bacon is handled with metal tongs so that human hands never touch it, thereby reducing danger of molding. Note conveyor made of seven separate parallel ribbons of stainless steel. Equipment—scales, Exact Weight Scale Co., Columbus, Ohio.



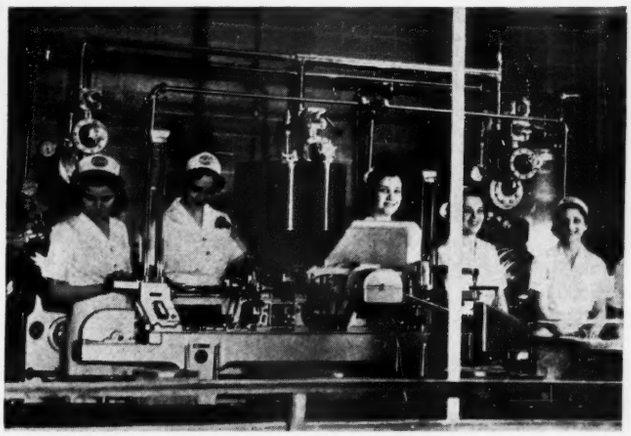
2F—Choice hams being smoked in glass-inclosed smokehouse at Swift exhibit. A strip of gauze passed around the butt helps support the hams on the smoking trees. This cloth gives the ham a smooth, rounded shape which looks good and yields a maximum number of large slices. During the first 16 hours of the 40-hour smoking period the temperature is brought up to 110 deg. F. Then the smoke is stopped and the temperature raised to 150 deg. in eleven hours, held for 2 hours and lowered to room temperature in eleven hours. Water is used to raise humidity in smokehouse. Heat is supplied by steam coils and smoke from hardwood sawdust burned by a gas flame.

3—Coca-Cola being bottled at rate of 140 bottles a minute in exhibit of Refreshment at the Fair, Inc. Clean bottles from a washer (out of picture at left) pass through a siruper, a filler, a crowner and then to a mixer (out of picture at right). Finished bottles travel between a strong light and a magnifying glass for inspection. Then they parade back along the 140 ft. counter for purposes of exhibition. Equipment—Liquid Carbonic Corp.

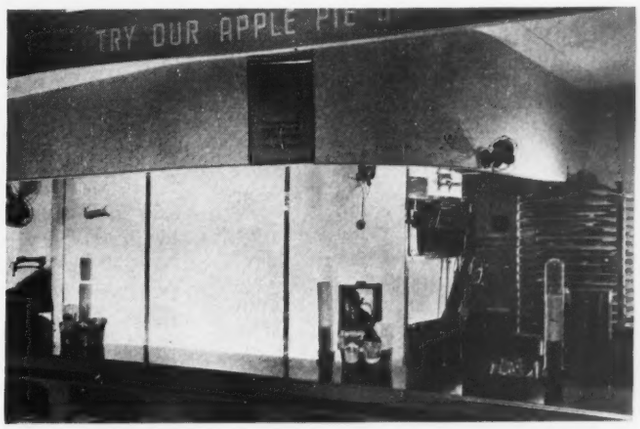


4—Two machines, each with a capacity of 58 packages a minute, form cream cheese into measured blocks and wrap it in foil at the Kraft exhibit of National Dairy Products Corp., New York. The cheese is fed to the machines through the stainless steel chutes. Plungers measure out the correct quantity and deposit it on a piece of foil on a turntable. As the table revolves, mechanical fingers fold the foil around the cheese. Then the packages are put into wooden cartons by the comely operator. These machines, imported from Geneva, Switzerland, are Kustner units.

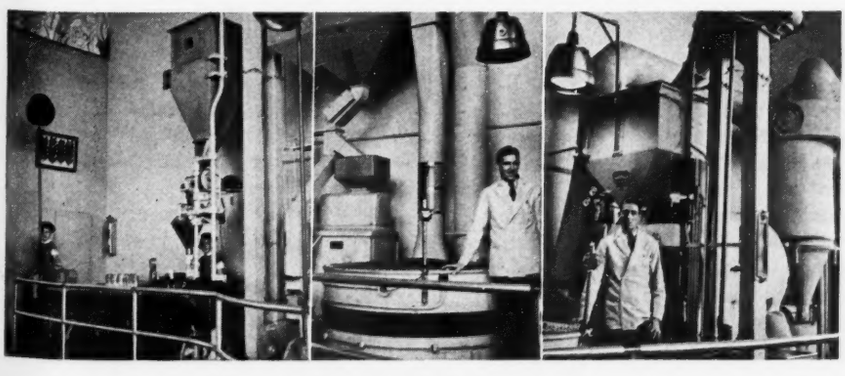
6—Three thousand quarts an hour is the capacity of the milk pasteurizing and bottling plant operated by Borden Co., New York, at the Fair. Raw milk from cows milked on the famous rotolactor goes into receiving tank at right. Then it is irradiated to introduce vitamin D, heated to 130 deg. in a tubular heat exchanger, then raised to 143 deg. and held for 30 minutes in vat pasteurizers. Next, the milk is cooled to 40 deg. in the lower coils of the tubular heat exchanger, passed into a stainless steel storage tank and then bottled by machine at center of picture. The filled bottles are closed with threaded aluminum caps formed by the capping machine. Clean bottles come to filler from washer at extreme left. Borden also operated a Mel-O-Rol ice cream plant. Equipment—irradiator, Hanovia Chemical & Mfg. Co., Newark, N. J.; Cherry-Burrell vat pasteurizers, bottle washer, raw milk storage tank and filler; Aluminum Seal Co. capping machine; Pfaudler pasteurized milk storage tank; Taylor temperature instruments, Englehard irradiation meter.



5—Three 40-80 gal. continuous freezers (in background) produced ice cream and ices at the Sheffield exhibit of National Dairy Products Corp. Mix was supplied to the freezers from two 500 gal. and four 50-gal. insulated stainless steel tanks. Ice cream was filled into Dixie cups by machine in foreground and was put into pint containers held under the discharge line of the freezers. Sheffield also pasteurized and bottled milk at the Fair. Equipment—Cherry-Burrell tanks and freezers; Dixie-Vortex Co. filling machine.



7—Pies were made, baked and sold hot to Fair goers at the exhibit of Wagner Baking Corp., Brooklyn, N. Y. A machine at right of oven (not in picture) rolls out the dough for the crust and trims the top crust to the shape of the pan after it is laid over the filling. Then the pies are baked in a gas-fired rotary oven. Equipment—Universal oven; Colborne dough trimmer.



8—Coffee can be roasted, cooled, granulated and packaged at a rate of 1,400 lb. an hour in the plant operated by Standard Brands, Inc., New York, at the Fair. In the roaster (at right), heat is applied to the coffee indirectly by a gas flame, the temperature in the roaster reaching 600 deg. F. The coffee itself reaches 364 deg., when a signal light shows and the operator starts taking samples. When the color is right, the operator shuts off the gas and empties the coffee from the roaster into a cooler (center) which is a drum with a perforated bottom through which air is drawn to bring the coffee to room temperature in about two minutes, "quenching" the roast. A pneumatic conveyor takes the coffee from the cooler to the granulator (left center), air cleaning it en route. From the granulator the coffee is elevated to the bag filler hopper. Standard Brands also operated a Danish pastry bakery and a yeast packaging machine. Equipment—Roaster, cooler and granulator, Jabez Burns & Sons, Inc.; bag-filling machine, Pneumatic Scale Corp.

Clearing up Misconceptions About

CHOCOLATE VISCOSITIES

Two methods of determination discussed and differences in results revealed. Action by industry suggested

By LEO FREUNDLICH

Hooton Chocolate Co., Newark, N. J.

IN a previous article (FOOD INDUSTRIES, November, 1937, page 630) a method was proposed for determining the viscosity of chocolate coatings with the MacMichael viscosimeter at 95 deg. F. The claim was made and is still held that chocolate viscosities determined at that temperature are more reliable indications of the confection-covering value of the chocolate than those determined at higher temperatures.

The proposed method was published for the purpose of opening up a discussion on the various conditions under which MacMichael viscosimeter readings should be made to get best results. It was thought that out of such a discussion one standard method might be arrived at for general use and thereby end the existing chaos arising out of the many different methods being followed.

Thus far there have been two critical replies to the proposed procedure. One before (FOOD INDUSTRIES, January, 1938, page 37) and one after (FOOD INDUSTRIES, October, 1938, page 564) trying the proposed method.

Two objections were made before trying the method. One was in respect to a small amount of latent heat evolved by the crystallization or setting of the highest melting point fractions of the cocoa butter. The other had to do with eddy currents likely to be set up when the viscosimeter cup revolves at 35 r.p.m. Those objections were not raised after the method was tried. Apparently the results obtained in the tests did not warrant the objections.

In setting up the conditions for the proposed method, over a period of nine years, no evolution of heat was observed at any time in the chocolate at 95 deg. F. Instead, the determinations have to be carried out rapidly to keep the temperature from decreasing during the test. Evolution of heat to maintain a constant temperature over the testing period would be desirable, but the evolution apparently does not take place. Also, eddy currents apparently do not interfere with the determinations at 35 r.p.m. any more than they do at 20 r.p.m. when the tests are correctly made. For that reason the eddies involved are negligible in their effect.

Another point in favor of holding to 95 deg. F., instead of the 130 deg. F. previously recommended and used by others, or the 100 deg. F. used by some laboratories, is the reversal in relative viscosity characteristics that some chocolates show at the different temperature levels. Such behavior is evidenced in Fig. 1.

The viscosities of two chocolate coatings, *A* and *B* were determined with a MacMichael viscosimeter at temperatures ranging from 130 deg. F. down to the setting temperature. Relationships between the viscosities and the temperatures are indicated by the curves. At 130 deg. F., chocolate *A* has a much lower viscosity than chocolate *B*. At 100 deg. F., chocolate *A* has a slightly lower viscosity than chocolate *B*. At 95 deg. F., chocolate *A* has a higher viscosity than chocolate *B*, as it has also at 90 deg. F., the temperature at which chocolate coatings are applied to the confection centers. This reversal of viscosity characteristics evidences that the viscosities determined at 95 deg. F. are more reliable indexes of the coverage value of chocolate coatings than those determined at 100 deg. F. or higher. Similar results can be obtained with many other chocolate coatings.

Although the desirability of one method of determining and expressing was first agreed to, subsequent implications are that such a step is unnecessary (FOOD INDUSTRIES, October, 1938, page 564). The implied recommendation is that the ratio of viscosities obtained by different methods can be established and that a constant factor can be used for the calculation of viscosities obtained by one method from viscosities obtained by a different method, e.g.: Method *A* viscosity x constant = Method *B* viscosity. The constant factor can be easily evaluated after a few careful comparisons.

The use of such factors is objectionable because these factors are not constants but are variables. They are different at different viscosities for the same lot of a chocolate and frequently also for different runs of the same type of chocolate at the same viscosity. Such factors for different types of chocolates are often entirely different when compared at the same viscosity, the difference frequently reaching large proportions. In establishing three ratios of viscosities between the Walter Baker method (FOOD INDUSTRIES, October, 1938, page 564) and the Freundlich method (FOOD INDUSTRIES, November, 1937, page 630) at 3.81, 3.69, and 3.68 there are variations which are significant. The trend of the ratios is distinctly indicated. The variations are small because the comparisons were made within a narrow range of viscosities. Their significance was passed over apparently because of insufficient experimental data. These variations are not the result of experimental error. They are real and must be correctly interpreted.

Relationships frequently occurring between viscosities determined by the proposed method and those determined by various other methods are illustrated by Fig. 2. I emphasize "fre-

Table I—Ratios Between Viscosities of Chocolate Coatings by Two Different Methods.

Viscosities by Walter Baker's Method	Viscosities by Freundlich's Method	Ratios of Viscosities by the Two Methods
25	8.0	3.12
50	15.5	3.22
75	23.0	3.26
100	30.0	3.33
150	44.0	3.42
200	57.5	3.48
250	70.0	3.57
300	82.0	3.66
350	95.0	3.69
400	107.5	3.72
450	120.0	3.75
500	130.5	3.83

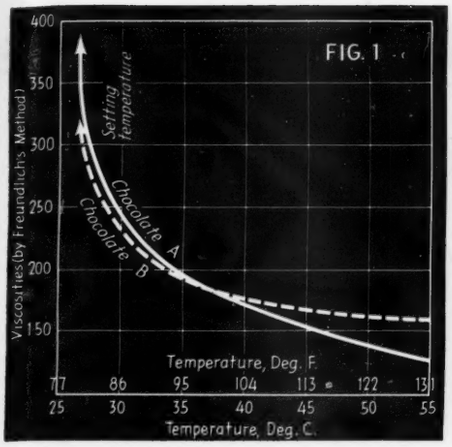


Fig. 1—Chocolate coatings often show reversal of comparative viscosity characteristics at various temperature levels.

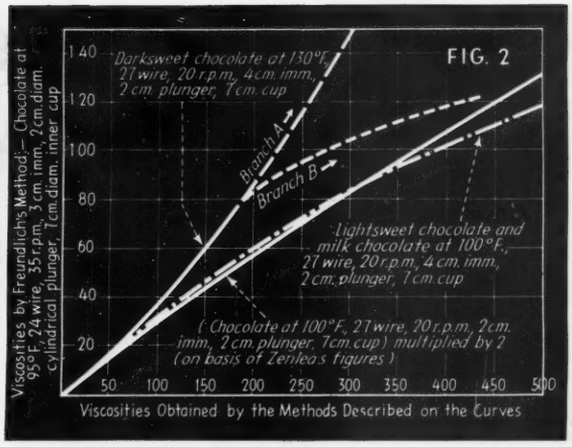
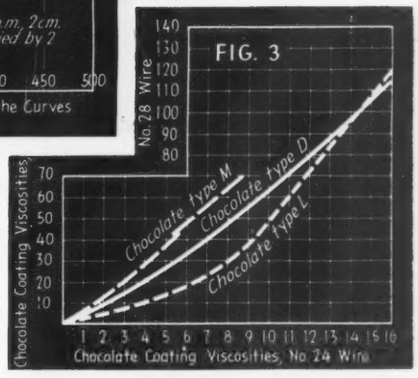


FIG. 2
Darksweet chocolate at 130°F., 27 wire, 20 r.p.m., 4 cm. imm., 2 cm. plunger, 1 cm. cup
Branch A
Branch B
Lightsweet chocolate and milk chocolate at 100°F., 27 wire, 20 r.p.m., 4 cm. imm., 2 cm. plunger, 1 cm. cup
(Chocolate at 100°F., 27 wire, 20 r.p.m., 2 cm. imm., 2 cm. plunger, 1 cm. cup) multiplied by 2 (on basis of Zenlea's figures)
Viscosities by Freundlich's Method:— Chocolate at 95°F., 24 wire, 35 r.p.m., 3 cm. imm., 2 cm. diam. cylindrical plunger, 1 cm. diam. inner cup
Viscosities Obtained by the Methods Described on the Curves

Fig. 2—Relationships between chocolate coating viscosities obtained by different methods differ in many cases; they cannot be relied upon in any particular case. Curves visualizing "frequently occurring" relationships may be useful when no other information is available. No constant ratio exists between chocolate coating viscosities obtained by two different methods.

Fig. 3—No constant relationship exists between chocolate coating viscosities obtained with two wires of different diameters, other conditions being the same. Ratios differ at different viscosities for one chocolate and, further, are different for different types of chocolate.



quently occurring." The relationship is different in many cases. An attempt to propose one pattern for expressing the relationship between viscosities determined by two different methods or, what is worse, to propose one factor for the conversion of viscosities determined by one method into viscosities determined by a different method would only increase the chaos now prevailing.

The Walter Baker–Freundlich curve in Fig. 2 was obtained by using the viscosities reported (FOOD INDUSTRIES, October, 1938, p. 564) and by extending the curve according to previous experience. In that manner the viscosities and ratios in Table I are found.

Such relationship charts can be worked out for reference when no other information is available with the hope that a particular case will fit into the "frequently occurring" pattern. A case reported in an advertisement printed on the back of reprints of the "Coverage Value of Chocolate Coatings" article from FOOD INDUSTRIES (November, 1937, page 630) does not fit. The discrepancy of the statements in the advertisement and the facts evidenced by experimental data was pointed out after the advertisement had been brought to my attention and has been pointed out whenever there has been a tendency to use constant factors for the conversion of viscosities determined by the various methods of procedure.

The Walter Baker viscosity in the advertisement is given as 314 and the Freundlich viscosity is given as 70; the ratio is 4.48. The accuracy of the determination is not questioned. But, that relationship will not hold for all chocolate coatings. It is different for each type of chocolate.

Also included in Fig. 2 are the "frequently occurring" relationships of viscosities determined both by the proposed method and the methods previously proposed and used by others. Worthy of note is the division of the 130 deg. F. curve into branches *A* and *B* illustrating the possible wide variation of the aforementioned viscosity conversion factors. This division of the curve indicates the unreliability of some viscosities determined at 130 deg. F. as an index of confection-covering value of chocolate coatings.

The validity of the formula,

$$\frac{M^{o}d_1}{M^{o}d_2} = \left(\frac{d_2}{d_1}\right)$$

and the statement, "Using two different wires, other conditions remaining the same, the MacMichael viscosimeter readings will vary inversely as the fourth power of the diameter of the wire," must be questioned for the same reason as the constant-viscosity conversion formula.

There may be some instances where the formula is fulfilled, but it has no general validity. Again there are various ratios at different viscosities of one chocolate when two different wires are used. Also, different types of chocolate have different ratios at the same viscosity with one wire and correspondingly different viscosities when the other wire is used.

These variations are illustrated in Fig. 3 in which the viscosities determined with a No. 28 wire are shown in relation to the viscosities determined with a No. 24 wire, all other conditions remaining the same. Three different types of chocolate show three different relationships.

A new and important reason in favor of my method of determining viscosities will be published shortly. This subsequent presentation will show a simple relationship between the viscosities obtained by my method and the results obtained from a direct method of determining the potential covering value of chocolate coatings.

In summation, the results of studies on determining viscosities of chocolate coatings are convincing that the use of constants or factors for conversion of viscosities by one method into viscosities by a different method are in the wrong direction. If properly interpreted the results obtained from charts or tables prepared in that manner reveal some information providing no other data are available. But, the discrepancies that come to light under critical analysis of results obtained emphasize the need for rationalization. The need for rationalization is indicative of the desirability of everyone's using the same method of determining and expressing the viscosity of chocolate. The universal method should be the method most suitable for expressing the confection-covering value of chocolate. It should be determined at a conference of technical men in the chocolate confectionery industry in which the pros and cons for each possible method can be set forth and evaluated.

Choosing Sweetening Agents in Food Manufacture

Many new factors increase importance of proper choice among sugars for manufactured foods for best quality and lowest cost of finished product

By R. S. McBRIDE
Consulting Chemical Engineer, Washington, D. C.

CHOOSING the sweetening agent for any manufactured food is a job of increasing importance. This task has been spotlighted recently in Washington where the optional ingredients have been discussed at great length in food standards hearings. Those proceedings have newly emphasized the great opportunity before food manufacturers in this part of their formula job. It has also been made clear that there are technical and economic considerations to be taken into account.

The wholesomeness of quite a variety of sweetening agents for use in food manufacturing has been established without question. Were that fact not true there would not be as great freedom of choice between the several sugars which are now offered commercially to the food maker. Until this wholesomeness, and the propriety of use of the various sugars, was demonstrated beyond question, there naturally remained doubt in the minds of many whether the substitution of one sweetening agent for another was dietetically proper. Apparently that question can now be dismissed.

Are Sugars Interchangeable?

Convincing testimony in the canned fruit hearing held by the Food and Drug Administration by several outstanding scientific authorities proved the nutritional value of the several sweetening agents which were being considered for use in canned peaches, pears, apricots and other fruits. These men are widely known authorities who have frequently assisted the government in its administration of the old Food and Drug Law. There can be no doubt of the competence of Dr. Anton J. Carlson of Chicago, Dr. E. V. McCollum of Johns Hopkins, and Dr. John R. Murlin of Rochester. They are eminently qualified to speak on these questions. They are unanimous in the view that the various sugars discussed are essentially interchangeable so far as their nutritive value is concerned.

The human body can use a variety of these sweetening agents very efficiently. Ultimately, they all become dextrose before they are assimilated to build up body structure or to supply body energy. From the dietetic value there is so little difference between ordinary sugar, dextrose, maltose, edible dextrines, and a number of the others discussed below that their food value can rightly be considered as substantially equal per pound of dry weight.

Food manufacturers can well proceed on the basis of this testimony to take account of other considerations that will determine which of these sweetening agents they use in their own products. The comparison is far more than one of mere cost or price per pound. A review of the various sugars as discussed in these hearings clearly demonstrates that the choice between them is governed by many considerations of product quality as well as those economic questions involved in the price paid to the sugar man or the cost of using in the food factory.

A review of these quality factors is well worth while, for much new information has only recently become available. It is the purpose of this article to mention and to present very briefly some of these manufacturing considerations so that the users of sweeteners can take advantage in their own plants of the demonstrated interchangeability, without incurring secondary difficulties through failure to take account of other important factors.

Available Sugars

Since cane sugar and beet sugar have been longest known and most frequently used, much of the discussion of the choice between sweetening agents is most readily presented by comparison of the newer products with these two traditional materials. In general, when the word "sugar" is used it means one or the other of these. Or, speaking in the language of the chemist, generally the word "sugar" means sucrose. But for sake of clarity, it is probably better to use this word sucrose when one means that particular compound.

When sucrose is dissolved to form a sirup and is boiled, especially in the presence of a trace of acid, it hydrolizes. This means that the double sugar, sucrose, takes on water to form the two simpler sugars, dextrose and levulose. One molecule of the sucrose with one molecule of water gives one molecule each of dextrose and levulose. This process is called inversion, and the product is invert sugar.

Probably such solution of invert sugar, or of the mixture of unchanged sucrose with invert sugar, has been the second best known sweetening agent. Very many sugar solutions are really partially inverted sirups, because the sucrose very readily takes on the water to change into these simpler sugars. Since it makes little difference to the food consumer whether part of the inversion has taken place in making the solutions or in the subsequent making of the manufactured food, or whether it takes place during digestion in his body, this whole group can commonly be considered together as sugar sirups.

The Corn Carbohydrates

When starch is treated with acidulated water it can be changed into sugars. That sort of change is very much like the inversion of sucrose, because the very complex starch molecule is merely being broken down step by step, ultimately to become dextrose when the inversion is complete. Starch is a complicated carbohydrate. When it is treated with acidulated water for inversion, in the food uses, it forms first a group of compounds somewhat simpler in structure, called edible dextrines. They are sometimes called "pro-sugars", because

they are progenitors of simple sugars.

As these edible dextrines are further inverted they become first maltose and then dextrose. The maltose is a double sugar, like sucrose in chemical composition, but of slightly different structural makeup. Because of this difference, when it breaks down by inversion it makes two molecules of dextrose and no molecule of levulose. The various changes from starch to edible dextrine, to maltose, and finally to dextrose go on simultaneously in corn sirup manufacture. Such sirup contains varying proportions of the pro-sugars (dextrines) and the sugars, maltose and dextrose.

If one continues long enough the changing of corn starch into sugars, he has ultimately completely inverted the starch and he has a product which is all dextrose. That simple sugar is now so made and is marketed in refined form like cane or beet sugar, and of comparable purity. As such it is used in many cases to replace the older type sugar. As a matter of fact, food manufacturers are already using about one quarter of a billion pounds of such dextrose annually in the making of bakery goods, confectionery, extracts and sirups, carbonated beverages, and a score of other manufactured foods.

Frequently it is not convenient to use a liquid, such as corn sirup, as a substitute for a dry granular material like sucrose or dextrose. The manufacturers of corn sirup have, therefore, prepared this material also in a solid form. That product, "corn sirup solids", is that mixture of edible dextrine, maltose, and dextrose in the proportions that the manufacturer has found to be most advantageous for food usage. These proportions can be varied according to the type of food or industrial application to be made of the corn sirup solids.

A number of other sugars are available commercially for special uses. Levulose has been so made, and the milk sugar, lactose, can be purchased. Generally speaking, however, neither of these sugars is considered seriously in food manufacturing because of their relatively higher cost or their special properties. They are, however, digestible sugars, and could be used under certain circumstances for certain products if the prices were favorable.

Recently effort has been made to deliver cane sugar in the form of a sirup at a lower cost than is possible with the refined granulated sugar of ordinary commerce. Such sirups are made from a variety of raw materials. They range all the way from molasses up to highly clarified and purified sugar sirup. Also for the purpose of offering a cheaper form of sucrose, brown sugars are frequently marketed. They are used by food manufacturers where the trace of molasses contained in the sugar either is not objectionable, or may actually be wanted because of its contribution to the taste of the finished manufactured food.

At the present time the choice of food manufacturers as to the sweetening agents is generally between sucrose (either beet or cane), dextrose, corn sirup or corn sirup solids, and the invert sucrose sirups, or their mixtures. Only occasionally do brown sugar, honey, or other specialty sweetened agents enter as strictly competitive products. They contribute particular characteristics of flavor; and for the present purpose they will be disregarded because a discussion of those features greatly complicates the comparison which it is so important for the food manufacturer to understand.

Product Quality

Any of the sugars or sirups above described contribute sweetness to the product in which they are used. It is for this reason that they are commonly spoken of as optional sweetening ingredients. But they contribute much more than mere sweetness. They influence largely the consistency or texture of the product. They affect the flavor characteristics of the other components of the food such as the fruit or other flavors which have been added. The choice of one or another sweetening agent may substantially change the other requirements of a food formula, such as the amount of fruit acid which should be added. The choice of a sugar may even determine the rate at which a product gets stale, as bread or cake. And frequently the choice of a sugar determines whether a product like jam or preserve keeps well without the formation of objectionable crystals or bloom.

For these reasons, the selection of a sweetening agent by the food manufacturer is very importantly determined by several characteristics of the product which he wishes to make. The question of sweetness is perhaps most commonly considered; but wise decisions are not made on sweetness only. Sucrose and invert sugar are more sweet than are dextrose or corn sirup. It is difficult to express the relationship in a quantitative manner. As a matter of fact, there is no scientific method by which absolute sweetness can be measured. Therefore, the preference of the purchaser of the manufactured food is inevitably the guide in determining which sugar and how much shall be used, in so far as the sweetness of the product is concerned. But this judgment of the purchaser is based on all the properties, not the sweetness alone.

Food manufacturers may frequently be puzzled these days by the advantages of both sucrose and dextrose. In the former one gets more sweet-

(Turn to page 656)

Consumption of Sugar in Food Industries

Data for 1937 consumption as reported by the Bureau of the Census. Corn sugar figures do not include corn sirup consumption, nor do they indicate the growth in use of dextrose since 1937. The corn sirup consumption in food manufacture is believed to have been between two and three times as great in pounds of carbohydrate used as was the corn sugar (dextrose) consumption in this group of industries. Tobacco products data are included with food industry figures below to conform with the classification as shown by the Census Bureau.

	Total Pounds	Cost	Beet Sugar Pounds	Cane Sugar Pounds	Corn Sugar Pounds
Total reported	3,923,982,252	$186,650,172	767,852,504	2,904,278,939	251,850,809
Beverages:					
Alcoholic (Distilled Liquors; Malt Liquors; Rectified and Blended Liquors; Vinous Liquors)	107,580,889	4,385,010	1,836,430	23,644,004	82,100,455
Nonalcoholic	291,924,527	14,321,279	10,780,948	278,856,575	2,287,004
Bread and other Bakery Products	1,130,639,487	55,031,680	278,819,580	749,449,194	102,370,713
Canned and Dried Fruits and Vegetables	612,667,098	28,674,735	162,186,900	440,396,658	10,083,540
Chewing Gum	59,520,509	2,772,009	19,709,737	38,220,685	1,590,087
Chocolate and Cocoa Products	243,321,893	11,210,383	48,009,804	194,451,644	860,445
Confectionery	761,049,404	35,924,626	182,126,414	559,191,264	19,731,726
Dairy Products (Butter; Cheese; Condensed and Evaporated Milk)	138,514,917	6,776,256	38,939,628	96,512,349	3,062,940
Flavoring Extracts and Flavoring Sirups	335,649,928	16,484,208	11,946,719	308,543,922	15,159,287
Food Products not Elsewhere Classified	196,887,896	9,170,474	11,089,421	175,452,403	10,346,072
Tobacco industries (Cigarettes; Cigars; Tobacco, Chewing and Smoking, and Snuff)	39,943,671	1,632,038	2,041,400	36,683,390	1,218,881
Other industries (Flour and other Grain-Mill Products; Macaroni, Spaghetti, Vermicelli, and Noodles; Vinegar and Cider)	6,282,033	267,474	365,523	2,876,851	3,039,659

Pickle salting station with tanks under shed roof.

Part III*

Forty Years of PICKLE SALTING

Salting, curing and care of cucumber pickles, onions, cauliflower, dill weed and peppers

By W. G. WORMLEY
San Jose, Calif.

Tank Pumps and Pumping

So far we have only mentioned pumping the tanks once on the day after final closing of a tank. Normally, this is all the pumping that is necessary until the pickles in the tank are cured. Some salters pump more than is necessary with the idea that they are saving salt, which is erroneous. Others do not pump enough to keep the brine sweet and pure on the top of the tank.

All tanks in which pickles are cured should be pumped every fifteen days and if, for any reason, brine has been added to a tank, the tank should be pumped at once. Pumping consists of sucking brine from the bottom of a tank by means of a pump in the pump box and pouring the brine back on the top for the purpose of mixing top and bottom brine.

It will be interesting to note the change that has taken place in the equipment used for pumping.

The first pump had a sort of umbrella-like plunger made of a piece of cotton duck or canvas, 5 ft. square. In the center of the canvas a steel ring, 1 in. in diameter, was fastened and a hole cut in the canvas inside the ring. Then a 5-ft. piece of net cord was fastened to each corner of the canvas, making the canvas from the center to the end of the cord measure about 8 ft. A pole, 1½ in. in diameter and 10 ft. long, was then procured and an oak pin 6 in. long and ½ in. in diameter was driven into one end of the pole. This pin was placed in the hole in the ring that had been fastened in the center of the canvas, producing what might be termed a ribless umbrella or parachute (see Fig. 12).

By grasping the pole with one hand and the four net cords with the other, the pole was forced, pin first, down into the pump box until the canvas was entirely submerged in the pickle brine in the pump box. Upon withdrawing it, the canvas opened up, filling with brine. As the pole was worked up and down the brine ran over the sides of the pump box. And, if this operation was continued long enough, the brine in all of the tank was pumped over.

A 12 in. baffle board, 24 in. long, was placed on the edge of the tank staves, back of the pump box, to prevent the brine from running out of the tank. The canvas pump was slow and its use laborious. It was soon abandoned.

The next method of tank pumping was the use of a regular wooden cistern pump with a pump log (wooden suction pipe). This was much better, but was heavy to handle, when moving it from tank to tank, and was displaced by the common iron pitcher pump with 1½ in. galvanized pipe and check valve. It is still in use where electric power is not obtainable or where labor is cheap. But, in most places, the electrically driven rotary pump is used. This is, however, a piece of expensive equipment and costs about 15 cents per hour to operate. A cheaper method has been sought and in the past few years I have been using a pump consisting of a pump log, a stainless steel propeller and a small electric motor. Figure 13 shows the construction of this pump, the cost of which is less than $50. Power consumption is very small.

This pump is also used to agitate other liquids, where it is possible to install a pump box in a tank or other container.

If the pickle tanks are in the open, the brine should be kept at a level as near to the top of the tank as possible so that, if it rains, the rain water will overflow the top edge of the tank and not materially reduce the brine test. This procedure is possible because the pickle brine is so much denser than pure water that the latter will float on its surface.

*Part I of this article appeared in FOOD INDUSTRIES, September, 1939, page 486; Part II, October, 1939, page 551.

When tanks are only partly filled and are to remain in that condition indefinitely, a 1-in. hole should be bored in two sides of the tank at the level of the brine so that the rain water will run off through the holes and not materially weaken the brine.

In boring holes in tanks, *be sure to bore the hole in the center of the stave!* Or, if the hole is being bored in the bottom of the tank, be sure the hole is bored in the center of the board and not at one edge, as this weakens the lumber and may ultimately cause the tank to leak. It is however, bad practice to bore holes in tanks and it should be avoided **whenever possible for** the reason that, when a tank is to be taken down and later reset, these holes always cause trouble and may even ruin a stave or bottom board.

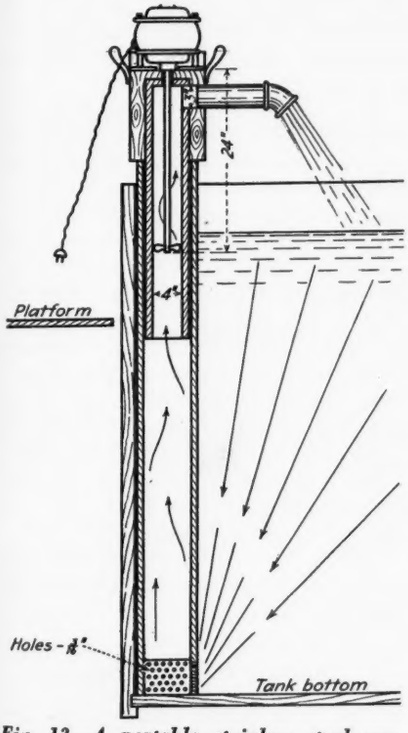


Fig. 13—A portable stainless steel propeller pump like this is the cheapest tank pump to operate.

In erecting pickle tanks, the important feature is to have a firm, level foundation—one heavy enough to carry the load. Also the tank should be plumb.

Every man who is just learning how to salt pickles can be counted on to try to make a "patent" tank cover, by cleating several pieces of the cover together. He does this thinking that it will save time. But this is an error, for the parts thus made are too heavy to handle. And, furthermore, the shape of the top of the tank changes every time the tank is filled, and hence the cover must be altered to make it fit. One inch boards, 12 in. wide, make an ideal cover. And, if left as individual boards, one man working unaided can cover a tank.

It is useless to try to paint or oil the hoops of pickle tanks, for nothing has yet been discovered that will withstand the pickle brine. Therefore, be sure that you have tank hoops as heavy as possible. Bare iron hoops will last as long as painted hoops.*

Brine from old tanks should not be used on newly filled tanks. Use 1937 brine on 1937 pickles, 1938 brine on 1938 pickles and so on, but never 1936 brine on 1937 or 1938 or 1939 pickles.

The average labor and salt cost over the United States should not be more than $0.30 per bushel of 50 lb.

If the salting is to be done south of the Ohio River and near a dependable salt supply, the cost can be reduced to $0.20 per bushel of 50 lb.

Cauliflower

The salting of cauliflower is very simple and may be done in tanks or barrels, but the best results are obtained by salting in barrels after first shrinking in shrinking tanks. The only difficulty in salting cauliflower is to keep the flower perfectly white, crisp and firm. To do this, much care must be taken to handle each head carefully so that you will have prime No. 1 flower.

Various kinds of shrinking tanks are used, such as the regular pickle process tank or an olive cask. The container used must be clean, sterile and tight.

Place 10 in. of 60 deg. Sal. brine in the tank or olive cask and then carefully dump the flower into the brine, until the flower reaches within 5 in. of the top of the tank. Next, place a sterile, clean cover over the flower and key it down tightly. Then add sufficient 60 deg. Sal. brine to bring the brine up, well over the entire cover.

Permit the cauliflower to remain in this for 36 hours, or until thoroughly shrunken, when it is ready to pack out into 45 gal. barrels.

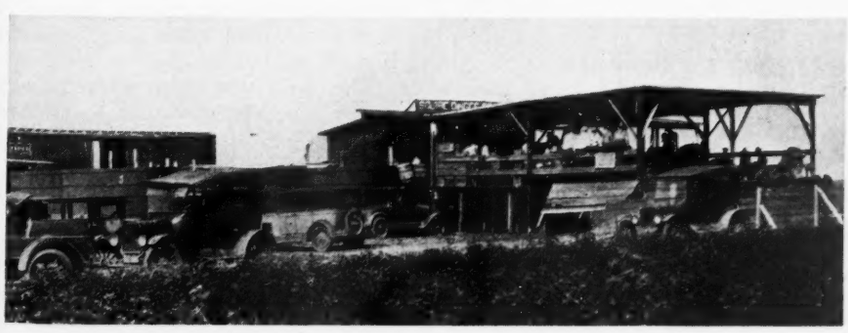
Barrels for packing cauliflower should be the best obtainable and should be well coated on the inside with paraffin to keep the flower white and clean.

To pack a barrel properly, fill the bottom of the barrel, first placing the stump of the flower against the bottom of the barrel to keep the tender flower itself from being bruised. Then place a row of heads around the side of the barrel with the stump of the flower against the side of the barrel and then fill in the center of the barrel. Continue in this manner until the barrel is full, but the last layer of flower placed in the barrel should be placed with the stump up so that the stump will come in contact with the head of the barrel, to avoid bruising the flower. The barrel is then headed up tightly and placed on its bilge, bung up, and the bung removed.

The brine that remains in the shrinking tank is then raised in strength to 60 deg. Sal. by adding salt. Now the barrel that has just been packed is filled through the bung with this 60 deg. Sal. brine and then bunged up tightly and stored on the bilge, in a cool place with the bung up.

Some packers are so particular that

*"Rustvoid" is said to be satisfactory to prevent rusting of tank hoops, but it is a product I have never seen nor used.



Pickle salting station in South Dakota, with 4—12x8 tanks in open and covered shed for receiving and other operations.

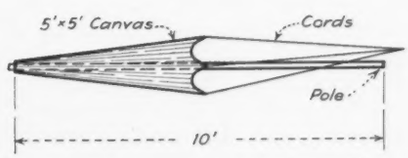


Fig 12—This sort of canvas pump, like a ribless umbrella, was formerly used as the plunger in a pump box, but it was very difficult to operate.

they make new 60 deg. brine to fill the barrels.

To salt cauliflower in tanks, place 15 in. of 60 deg. Sal. brine in the tank and fill the tank carefully with cauliflower. When the tank is full, place the cover on the tank and key it down. Add enough 60 deg. brine to raise it 4 in. over the cover. Watch the brine test carefully from day to day and keep the brine at 60 deg. Sal. by adding dry salt.

Here is a method that can be used if tank capacity is lacking. After the tank has been closed for 36 hours, the brine may be pumped off into casks and more flower added. Then the tank is closed again and the brine that was previously pumped off into casks is raised to 60 deg. Sal. and replaced on the tank. After 36 hours, sufficient additional salt is added to bring the brine up to 60 deg. again, as it will have been lowered in test to about 35 deg. Sal. by the water extracted from the cauliflower.

I do not favor the tank method of salting, as the color of the flower is never as good as that obtained by packing from shrinking tanks into barrels.

When the cauliflower pack is small and equipment is lacking, one may proceed as follows: Pack new fresh cauliflower into a clean paraffined barrel, following the same system that has been described for packing barrels from shrinking tanks, except that you fill the barrel only to within 2 in. of the top. Keep it upright, then fill the barrel through the top, with all the 60 deg. brine it will hold and lay the head on the top of the barrel. Be absolutely sure that all the flower is covered with 60 deg. brine and is not exposed to the sun or strong light. Proceed in this manner until you have all the cauliflower packed for the day. Hold it in brine for 36 hours.

After 36 hours have elapsed and the flower in the barrels is well shrunken, start with the first barrel that was packed, remove the bung and drain off the brine down to the bung. Remember that the barrel is upright. Catch and save the brine in buckets or tubs. Then tip the barrel and drain off the brine remaining in the barrel. You will find that when the barrel has stood for a short time, the flower will have settled down and that there will be quite an empty space at the top of the barrel. Fill the space with shrunken flower from one of the other barrels, being sure that the last layer is packed with the stump up and that the barrel is tightly filled. Then head up the barrel and fill through the bung, with 60 deg. Sal. brine made from the brine taken from the barrel by adding enough dry salt. Then bung up the barrel tightly and store on the bilge, with the bung up, in a cool place.

If you follow carefully the foregoing instructions, you will find it will require one barrel of shrunken flower to repack 9 barrels for storage. Therefore, the shrinkage will be 10 per cent; but if the work is carelessly done it will be more.

Many packers salt cauliflower in much lower test brine and produce passable flower, but the foregoing method will always produce No. 1 prime flower.

The maximum labor and salt cost should not exceed $1.25 per 45-gal. barrel.

Salting Onions

Be sure that the onions to be salted are properly matured, that is, thoroughly ripe and have been dried and are free from stems and dirt.

Onions that have "heated" cannot be salted.

It is customary to run the dry ripe onions over a screen to eliminate the sand and dirt, and also the small onions less than ½ in. in diameter.

Any size of tank can be used for salting onions but, for the purposes of this discussion, we will assume a tank 14 ft. in diameter with 8 ft. staves. Place 12 in. of 90 deg. Sal. brine in the tank and dump the clean dry ripe onions into the tank until the tank is filled within 10 in. of the top, being sure that the onions are kept level and even in the tank. Then place the tank cover very carefully over the onions. Make sure that it is tight, so that no onions can get out from under the cover. Next key the cover down with heavy timbers, as onions ferment very violently and produce much gas. The ordinary 2 x 4 in. timbers used on pickles will not hold the pressure thus created.

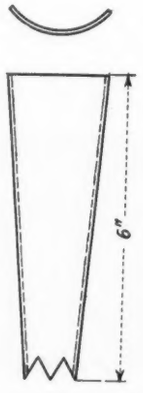


Fig. 14—This small home made tool is commonly used for coring pepper hulls.

After the cover is properly keyed on, fill the tank with 90 deg. Sal. brine until the brine is at least 4 in. above the cover. Then spread 1,000 lb. of salt evenly over the top of the tank. On the next day, pump the brine over thoroughly. If the salting has been accurately done, the test of the brine will be 90 deg. Sal.; but, if it is not 90 deg., add salt slowly until the brine test reaches that figure. Keep the test at that point.

Never add salt directly on the onions, as the salt crystals coming in contact with the onions will injure their color.

Onions are not considered properly cured until they will sink in their own brine, which will require from three to four months.

If for any reason fresh onions should not be received for a week or more, and you have a partly filled tank, it is permissible to resume salting in the same partly filled tank by following the next procedure:

Remove the cover, then pump off sufficient brine into casks so that the onions in the tank will not float. Now add more fresh onions to those in the tank. Replace the cover and return the brine that has been pumped off into casks after ascertaining if it tests 90 deg. Sal. If it is weaker than 90 deg. then add enough salt to the brine to bring it back to 90 deg. Enough brine must be returned so that it will stand 3 or 4 in. over the cover, then add 1 lb. of salt for every 50 lb. of fresh onions just placed in the tank. Pump the tank on the next day and if the brine test is not 90 deg. add salt slowly until 90 deg. is reached.

Labor and salt cost should not exceed $0.50 per 50 lb. of onions in any locality.

Salting Pepper Hulls

The sweet peppers, having been received according to the purchase contract, are placed on a table and the seeds removed by coring and splitting the pepper lengthwise into two halves.

Coring is accomplished by a simple device, resembling a bung funnel in appearance, and made as shown in Fig. 14.

The hulls are then washed in a rotary type spray washer to remove the sand and dirt and any seeds that may have been left in the hulls.

Salting Pepper Hulls in Barrels

The washed hulls are packed into 45 gal. barrels, first placing alternately a layer of hulls in the barrel and then a layer of salt, continuing this process

(*Turn to page 655*)

UNITED STATES DEPARTMENT OF AGRICULTURE

Agricultural Marketing Service

TENTATIVE UNITED STATES STANDARDS FOR GRADES OF

CANNED GRAPEFRUIT JUICE

EFFECTIVE OCTOBER 1, 1939

DEFINITION

CANNED grapefruit juice is composed of the unfermented juice obtained from the properly matured fresh fruit of the grapefruit tree (*Citrus grandis osbeck*), which has first been properly washed; may be packed with or without the addition of sugar, and is sufficiently pasteurized to assure preservation of the product in hermetically sealed containers.

GRADES OF CANNED GRAPEFRUIT JUICE

»» ***U. S. GRADE A (Fancy) canned grapefruit juice*** possesses the color of fresh pressed juice, not darker than Plate 10, G 1, as illustrated in Maerz and Paul "Dictionary of Color." The juice is practically free from defects, containing not more than 10 per cent free and suspended pulp when determined according to the method outlined herein. The juice tests not less than 9.5 degrees Brix if unsweetened, and not less than 13.5 degrees Brix if sweetened; contains not less than 1.0 per cent and not more than 1.7* per cent anhydrous citric acid; contains not more than .014 per cent by volume of recoverable oil; possesses a normal canned grapefruit juice flavor; and scores not less than 90 points when scored according to the scoring system outlined herein.

* Grapefruit juice containing more than 1.7 per cent, but not more than 1.9 per cent, anhydrous citric acid, will be certified as U. S. GRADE A (Fancy) without exception, provided the juice, if unsweetened, has been packed from fruit meeting the maturity requirements of the State in which the juice originated, and provided that all other requirements for U. S. GRADE A (Fancy), as set forth herein, are met.

»» ***U. S. GRADE C (Standard) canned grapefruit juice*** possesses a good color which may have a slight amber tinge, but is not darker than Citron Yellow, Plate 10, J 2. The juice is reasonably free from defects, containing not more than 15 per cent free and suspended pulp. The juice tests not less than 9.5 degrees Brix if unsweetened, and not less than 13.5 degrees Brix if sweetened; contains not less than 0.8 per cent and not more than 2.0 per cent anhydrous citric acid; contains not more than .020 per cent by volume of recoverable oil; possesses a normal canned grapefruit juice flavor; and scores not less than 70 points when scored according to the scoring system outlined herein.

»» ***OFF-GRADE (Substandard) canned grapefruit juice*** is grapefruit juice that fails to meet the requirements of the foregoing grades, or when any one of the grading factors falls in subdivision D, or fails to meet any standard promulgated under the terms of the Federal Food, Drug, and Cosmetic Act.

EXPLANATION OF TERMS

As used in these grades:

"13.5 degrees Brix" means that the juice shall test 13.5 degrees at 68 degrees Fahrenheit when tested with a Brix spindle, or hydrometer, when read at the proper temperature for the instrument used.

"Properly matured" means that the juice has been prepared from fruit meeting the maturity requirement of the State in which the juice is declared to have been packed as well as the requirements of the Federal Food, Drug, and Cosmetic Act. If the State maturity requirements are not met, certificates of grade shall bear the following legend:

"Grade not certified account failure meet
Maturity requirements of State of ....."

"Normal Canned Grapefruit Juice Flavor" means that the product is free from objectionable or off flavors of all kinds.

For the purpose of these grades the percentage of free and suspended pulp is determined by the following method: Graduated centrifuge tubes with a capacity of 50 cubic centimeters are filled with juice and placed in a suitable centrifuge. The speed is adjusted, according to diameter, as indicated in the following table, and the juice is centrifuged for exactly ten minutes. As here used, "diameter" means the over all distance between the bottoms of opposing centrifuge tubes in operating position. After centrifuging, the cubic centimeter reading at the top of the layer of pulp in the tube is multiplied by 2 to give the per cent of pulp.

DIAMETER	APPROXIMATE REVOLUTIONS PER MINUTE
10 inches	1609
10½ inches	1570
11 inches	1534
11½ inches	1500
12 inches	1468
12½ inches	1438
13 inches	1410
13½ inches	1384
14 inches	1359
14½ inches	1336
15 inches	1313
15½ inches	1292
16 inches	1271
16½ inches	1252
17 inches	1234
17½ inches	1216
18 inches	1199
18½ inches	1182
19 inches	1167
19½ inches	1152
20 inches	1137

Anhydrous citric acid is determined by the following method: To exactly 10 cc. of grapefruit juice add 40 cc. of distilled water. Shake together well in an Erlenmeyer flask and titrate with 1/9 Normal Sodium Hydroxide solution, using a few drops of phenolphthalein solution as an indicator. Titrate to a light, permanent pink color (the color will at first fade away). Note the number of cubic centimeters of NaOH used and, if the juice is unsweetened, multiply this number by .0685. If the juice is sweetened, multiply by .0674. The result will be the per cent of acid, calculated as anhydrous citric acid, present in the juice.

Per cent by volume of recoverable oil in grapefruit juice is determined by the following method: A three liter flask, for use as a steam generator, is about half filled with water, and is connected with a glass tube to a five liter flask containing exactly three liters (3,000 cc.) of grapefruit juice. The connecting tube is fitted with an escape cock and the tube must extend nearly to the bottom of the five liter flask. The outlet from the sample flask is equipped with a Kjeldahl connecting bulb and an 18 inch condenser. The condenser is set up to discharge into a Bromwell fusel oil separatory funnel, which is equipped at the bottom with a glass tee and a constant level overflow, discharging into a 250 cc. graduated cylinder. The overflow is adjusted to keep the liquid level of the distillate above the constricted portion of the separatory funnel. Before beginning the distillation, the condenser is thoroughly cleaned and is wet. The separatory funnel is filled with distilled water. The water in the steam generator is brought to a boil, and the sample of juice simultaneously brought nearly to a boil, by direct heat. The escape cock on the connecting tube is then closed, so that the steam passes through the sample and thence through the condenser. Direct heat is withdrawn from the sample during the early part of the distillation and is later re-applied to prevent excessive condensation in the sample flask. The rate of boiling in the steam generator is so adjusted that the condensation of the distillate will be complete in the upper half of the condenser. Distillation is continued until 125 cc. of water has been collected in the graduated cylinder. By means of a pinchcock at the bottom of the separatory funnel, the oil layer is lowered within the graduation marks, and after standing ten minutes, the amount present is estimated to the hundredth of a cc. Multiply the number of cubic centimeters of oil recovered by .0333 to obtain the per cent by volume of recoverable oil.

PREREQUISITES TO GRADING

Containers shall be sound and clean. If the containers are metal, they shall be free from rust and serious dents, and the ends shall be flat or concave.

Condition of Package and Label

If cased, the canned grapefruit juice shall be packed in clean, neat, unbroken packages. If labeled, the labels on the container and package shall be clean, and shall be neatly and securely affixed, and shall comply in all respects with the requirements of the Federal Food, Drug, and Cosmetic Act.

Fill of Container

Cans of grapefruit juice shall be considered as of standard fill if the headspace, measured from the top of the product to the under side of the lid, does not exceed 10 per cent of the total inside height of the container.

A certificate of grade covering canned grapefruit juice that does not meet the above requirements shall bear the legend,

"Below U. S. Standard"
"Slack Fill"

The maximum headspace allowable in the cans commonly used in packing canned grapefruit juice is shown in the accompanying table.

Can Size	Can Dimensions (In Inches) Diameter	Height	Maximum Capacity in water at 68 deg. F. (In ounces)	Maximum headspace allowable (measured from top of double seam in 16ths of an inch)
No. 8-Z Tall.....	2-11/16	3-4/16	8.68	7.6
No. 1 Eastern....	2-11/16	4	10.94	8.8
No. 211 (12Z)....	2-11/16	4-14/16	13.6	10.2
No. 300.....	3	4- 7/16	15.20	9.5
No. 303 Spec.....	3- 3/16	5- 4/16	19.2	10.8
No. 2.....	3- 7/16	4- 9/16	20.55	9.7
No. 3 Special..... (46 Ounce)	4- 4/16	7	51.7	13.6
No. 5.....	5- 2/16	5-10/16	59.22	11.4
No. 10.....	6- 3/16	7	109.43	13.6

ASCERTAINING THE GRADE

The grade of canned grapefruit juice may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color, Absence of Defects, and Flavor. The relative importance of each factor has been expressed numerically on a scale of 100. The maximum number of credits that may be given for each factor is:

		Points
I.	**Color**	35
II.	**Absence of Defects**	35
III.	**Flavor**	30
	TOTAL SCORE	100

ASCERTAINING THE RATING OF EACH FACTOR

The essential variations within each favor are so described that the value may be ascertained for each factor and expressed numerically. The numerical ranges within each factor are inclusive. For instance, the range 32 to 35, means 32, 33, 34, and 35.

»» *I. COLOR*

(A) To receive a rating within the highest group, 32 to 35 points, the juice must have the typical color of fresh pressed juice, not darker than Plate 10, G 1* (see page 623). Juice that does not meet this requirement shall not be graded above U. S. Grade C (Standard), regardless of the total score for the product.

(C) If the juice has a slight amber color, but is not darker than Plate 10, J 2* (see page 623), a credit of 25 to 31 points may be allowed. Juice falling in this classification may not be graded above U. S. GRADE C (standard), regardless of the total score for the product.

(D) If the juice is off-colored or is darker than Plate 10, J 2*, a credit within the range of 0 to 24 points may be allowed.

NOTE: When samples of juice are said to have been packed from fruit commonly known to the trade as "pink fruit," the factor "Color" may be scored in the "A" range provided the color is not darker than Plate 10, H 2,* (see page 624) and may be scored in the "C" range provided the color is not darker than Plate 10, H 4* (see page 624).

*Colors as illustrated in Maerz and Paul, "Dictionary of Color."

»» *II. ABSENCE OF DEFECTS*

The factor absence of defects deals principally with workmanship. The presence of particles of membrane, core, skin, seeds, "rag," or other residue, is to be reflected in the scoring of this factor.

(A) Juice that is practically free from defects mentioned, and that contains not more than 10 per cent free and suspended pulp, when determined according to the method outlined herein, nor more than .014 per cent by volume of recoverable oil, may be given a credit of 32 to 35 points. Juice that shows coagulation of pulp shall not be scored in this range.

(C) If the defects are noticeable and the juice contains not more than 15 per cent pulp, nor more than .020 per cent by volume of recoverable oil, a credit of 25 to 31 points may be allowed. Juice that shows more than a slight coagulation of pulp shall not be scored in this range. Juice falling in this classification shall not be graded above U. S. GRADE C (Standard), regardless of the total score for the product.

(D) If the defects are decidedly prominent, or if the juice contains more than 15 per cent pulp, or more than .020 per cent by volume of recoverable oil, or if the juice shows decided pulp coagulation, a credit within the range of 0 to 24 points may be allowed.

»» *III. FLAVOR*

The factor relating to flavor and aroma of canned grapefruit juice shall be classified from the standpoint of palatability.

(A) If the juice possesses a fine, distinct grapefruit flavor, free from traces of scorching, oxidation, and terpene, a credit of 26 to 30 points may be allowed.

(C) If the juice possesses a fairly good flavor, having an oxidized, terebinthic flavor, but is not objectionable, a credit of 20 to 25 points may be allowed. Juice falling in this classification may not be graded above U. S. GRADE C (Standard), regardless of the total score for the product.

(D) If the juice possesses an off flavor or is distinctly disagreeable to the taste for any reason, or has the flavor of green fruit, a credit within the range of 0 to 19 points may be allowed.

Approved

W. G. MEAL, *In Charge,*
Fruit and Vegetable Division.

Approved

C. W. KITCHEN, *Chief,*
Agricultural Marketing Service.

Certificate No. .....
Lot or Car No. .....
No. of Cases in Lot.....

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
SCORE SHEET FOR CANNED GRAPEFRUIT JUICE

Applicant .....
Address .....
.....
Samples submitted by

CAN SIZE

CAN MARK															
LABEL															
NET WEIGHT (In Ounces)															
VACUUM (In Inches)															
DENSITY (Degrees Brix)															
PER CENT ANHYDROUS CITRIC ACID															
PER CENT RECOVERABLE OIL (Volume)															
FACTORS	Max. Score	Points Allowable													
I. COLOR	35	(A) 32—35 (C) 25—31 (D) 0—24													
II. ABSENCE OF DEFECTS	35	(A) 32—35 (C) 25—31 (D) 0—24													
III. FLAVOR	30	(A) 26—30 (C) 20—25 (D) 0—19													
TOTAL SCORE	100	.....													
GRADE	.....	.....													

Remarks.....

Graded by..... Date..... Fee $.....

Graded by..... Date..... Fee $.....

Color Standards for Grades of *"Common or Yellow"* Canned Grapefruit Juice

PLATE 10, G1 (*Maerz* and *Paul "Dictionary of Color"*). *To receive a rating within the highest group, the canned juice of the common yellow grapefruit must not be darker than Plate 10, G1. Juice that does not meet this requirement shall not be graded above U. S. Grade C.*

PLATE 10, J2 (*Maerz and Paul "Dictionary of Color"*). *Canned juice of the common yellow grapefruit that has a slight amber color, but is not darker than this plate, may be graded U. S. Grade C.*

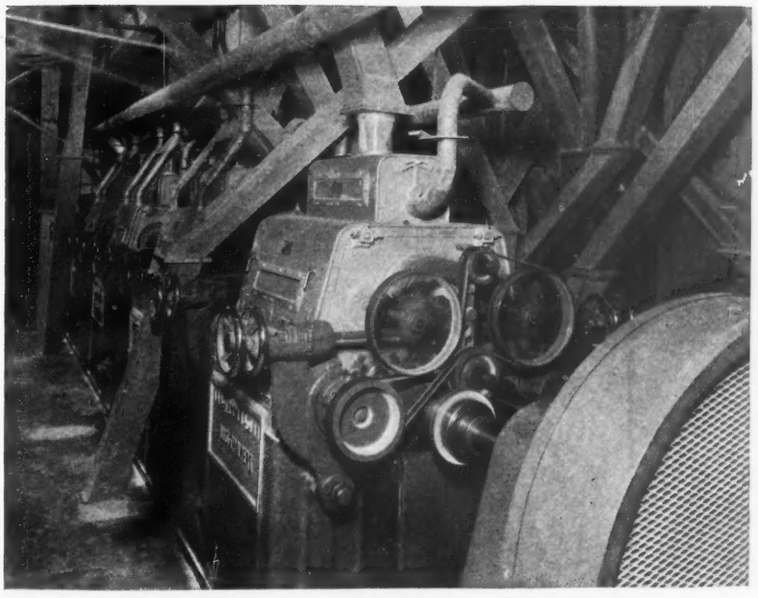
Color Standards for Grades of "*Pink*" Canned Grapefruit Juice

PLATE 10, H2 (*Maerz and Paul "Dictionary of Color"*). *Grapefruit juice packed from grapefruit commonly known to the trade as "pink fruit," may be scored in the U. S. Grade A range, provided the color is not darker than Plate 10, H2.*

PLATE 10, H4 (*Maerz and Paul "Dictionary of Color"*). *Grapefruit juice packed from grapefruit commonly known to the trade as "pink fruit," may be scored in the U. S. Grade C range, provided the color is not darker than Plate 10, H4.*

Direct-drive Mills *Cut Grinding Costs*

New type rolls installed in previously non-usable floor space increase production, give higher yield, lower power and maintenance expense and provide safer and cleaner working conditions.



Production costs are lower and working conditions better with this new type of flour mill equipment. Assembled in a battery, the four mills are driven through short V-belts and shafts by base mounted motors. This equipment was put in previously non-usable floor space to increase production capacity and give better balanced grinding and separating operations with higher yield.

LOWER milling costs, cleaner operating conditions and a safer place for employees have been attained by Atkinson Milling Co., Minneapolis, in a new addition to its production equipment. At the same time the plant capacity has been increased and the yield of flour per bushel of wheat stepped up through better balanced grinding and separating operations. All this was attained by utilizing previously non-usable floor space and without shutting down any part of the mill for alterations or without contaminating the product with dust from remodeling operations. The many advantages were made possible by the installation of something new in the way of flour milling machinery—the battery-assembly roller mills driven by motors mounted on the same base as the mills.

About two years ago the milling company found it advisable to increase its wheat grinding capacity by installing four more rolls. Floor space was available on the spouting floor for the mills themselves, but there was no place for mounting the line shaft drives nor space in which belts could operate. So recourse was had to the new type of milling machinery. These mills are designed to fit into a straight-line battery of two, three, four and possibly more units assembled end to end. Assembled on the same base as the mills are two motors which drive the rolls.

Each mill consists essentially of two pairs of rolls operating parallel to each other in the same horizontal plane. Each pair of rolls has a fast roll driven by a shaft running the full length of the battery and connected to a driving motor through a short multiple V-belt. The slow roll of each pair is driven individually from the fast roll through a short roller-chain differential drive. The motor for one line of fast roll shafting is at one end of the battery and that for the other at the opposite end. For this battery of four 9x30 in. double rolls, two 20-hp. Allis-Chalmers totally enclosed fan cooled motors are employed.

To protect employees, the V-belt motor drives are covered with safety guards and the roller chains driving the slow rolls are enclosed. This leaves no moving device with which employees can become entangled.

Although the battery of four rolls has a length of 30 ft. 8 in., a width of 5 ft. at the ends for motor mounting and a height of 5 ft. 9 in., each motor and each mill with its portion of the common base arrived at the mill as a separate unit to be skidded into its position under and between the spouting lines. When lined up in assembly, the lines of fast roll shafting were connected to the motors and the battery was ready to go into action. Spouting connections to the mills, of course, had to be made.

Operation has shown that the kilowatt hours consumed per barrel of flour milled is less with this equipment than it was under the previous set-up. Belt replacement and maintenance costs on the mills has amounted to nothing. There has been less oil consumption, better grinding performance with less general maintenance and lower break-stock temperatures than on the same number of mills on the regular roll floor. Through the elimination of belt friction and tension there has been a measurable reduction in bearing temperatures. In this way the temperatures of the grinding rolls have been reduced with the resultant reduced temperatures in the break-stock. Further, drive belt slippage is non-existent, as is the likelihood of dust accumulation so generally found in pulleys and shafting mountings.

Installation of the new equipment not only gave the company the additional milling capacity desired but permitted better balanced grinding and separating operations with a 2 to 3 per cent increase in extraction of finished flour from each bushel of wheat ground.

New Method of
PREVENTING RANCIDITY

Ascorbic acid (vitamin C) and related compounds as anti-oxidants in preventing rancidity*

By
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and
IRWIN STONE
Wallerstein Laboratories, New York, N. Y.

▶ ***No technical problem has given any more trouble to food manufacturers or caused them any more losses in spoiled material and returned goods, than has oxidation and the development of rancidity. Because of this, the search for inhibitors has been widespread. In this paper, the authors give the results of tests of inhibitors that should prove helpful to all manufacturers of***

Animal Oils and Fats
Dairy Products
Margarine
Mayonnaise
Meat Products
Salad Dressings
Shortenings
Vegetable Oils

RANCIDITY changes in oils and fats represent a problem of great economic, as well as nutritional, importance, as is widely recognized in the food industry. The solution of the problems concerned with retarding or preventing such changes has engaged the efforts of many investigators, and a considerable body of literature is in existence on the subject. Recently, an excellent review by Lea[1] summarized the vast amount of work that has been done in 230 closely packed pages of data. As pointed out in this review, much of the work which has been reported in the literature on rancidity prevention and on the development of anti-oxidants was conducted on relatively pure, dry oils, for example, bulk cottonseed oil, corn oil, beef stearin and lard.

Many fatty foods, such as mayonnaise, cream, butter, milk, dried milk and eggs, contain fats similarly subject to rancidity but in an emulsified form. In such a form, the fat is thoroughly dispersed throughout the food. Because of the high degree of dispersion, enormous surface areas of the fats are exposed to the action of dissolved air and soluble materials present in the aqueous phase. For example, Palmer[2] has estimated that in the case of one pound of butter the waterfat interface possesses a surface area equal to approximately 1,000 square meters (10,764 sq.ft.). As a result of the enormously increased interfacial area, the relative rates of the reactions taking place, and even the character of the reactions, will be completely changed. The development of rancidity in such fatty emulsions is due in a large measure to reactions taking place at this fat-water interface. If these interfacial reactions can be retarded by the use of anti-oxidants in the aqueous phase, it should be possible to reduce the rate at which the fatty phase will show rancidity development.

Many of the anti-oxidants in the aqueous been reported as useful for retarding rancidity development in the case of dry bulk oils are known to be valueless in the presence of moisture[3] and hence are not applicable to fatty emulsions. Many of those suggested are phenolic or amine-like bodies which, for obvious reasons involving their physiological effects, cannot be used in food products. The search for more wholesome substitutes has resulted in proposals to utilize anti-oxidants naturally present in cereal flours, crushed seeds, etc.; also carotene and lecithin. Maleic acid and organic hydroxy acids have been proposed. Conflicting data as to the possible benefits for many of these materials has been reported.

We have recently shown[4] that ascorbic acid (vitamin C) and related compounds, when added in small amounts, prevent or retard the development of rancidity in emulsified fatty foodstuffs. Ascorbic acid and other related compounds are water soluble and are dissolved in the aqueous phase of the emulsion. This treated aqueous phase is in contact with the interfacial surfaces of the emulsified fats and inhibits the reactions that lead toward the development of rancidity. When rancidity develops, there is generally a concomitant loss of the fat-soluble vitamins A and E. We have also

Table I—Olive Oil Emulsions

Peroxide Values

(ml 0.002 N per gram fat)

Days standing at 30 deg. C.	0	8	32	48	67	79	107
Neutral emulsion—oil "A"							
Control	3.0	6.0		8.7	14.5	29.0	47.8
Ascorbic acid—0.013 per cent.	3.0	5.1		7.9	9.1	9.4	11.0
d-Gluco ascorbic acid—0.019 per cent.	3.0	5.3		6.4	8.6	8.8	12.9
d-Gluco ascorbic acid—0.063 per cent.	3.0	3.1		5.4	6.6	7.3	6.8
Acid emulsion—oil "A" acetic acid—0.13 per cent							
Control	3.0	5.8		25.0	72.0	94.0	120.0
Ascorbic acid—0.013 per cent.	3.0	5.0		10.3	14.8	11.2	18.7
d-Gluco ascorbic acid—0.019 per cent.	3.0	5.3		8.3	12.6	11.6	26.3
d-Gluco ascorbic acid—0.063 per cent.	3.0	5.3		6.9	8.5	8.9	11.0
Acid emulsion—oil "B" acetic acid—0.13 per cent							
Control	3.0	10.8	96.0	137.0		193.0	
d-Gluco ascorbic acid—0.05 per cent.	3.0	3.6	5.3	6.5		8.1	
Reductone—0.05 per cent	3.0	3.8	5.9	7.8		9.9	
Dihodroxy maleic acid—0.05 per cent.	3.0	4.1	5.2	6.4		7.7	
Unemulsified control.	3.0			11.8		26.2	

* U. S. Patent No. 2,159,986 was recently granted to the authors, covering treatment of fatty emulsions with ascorbic acid and related compounds to prevent and retard deterioration resulting from oxidation.

shown that inhibiting rancidity by means of these compounds prevents the destruction of these important vitamins. The ascorbic acid compounds, in the amounts used, impart no foreign odors or tastes when added to the various products. The neutral salts of the ascorbic acid series are tasteless, even in high concentrations, while the acid members taste acidulous. This acidic taste is due entirely to their low pH and they become tasteless on neutralization.

To show their pronounced antioxidant qualities, we present herewith some of the results of various experiments in which olive oil emulsions, milk, egg yolk, mayonnaise and other products were treated with ascorbic acid and related compounds.

Olive Oil Emulsions

A stable, semi-solid (50–50) olive oil emulsion which could be easily separated for testing purposes was prepared by mixing warm olive oil with an oxycholesterine emulsifier and then beating in the warm aqueous phase. The ascorbic acid, *d*-gluco ascorbic acid**, and other compounds were dissolved in the water before emulsification. The stirring was continued until the batch cooled and a thick homogenous, semi-solid cream resulted. Each batch was then spread into a number of uniform flat ½-oz. jars and placed in a ventilated 30 deg. C. incubator. By using these jars for holding the various samples, each test sample was uniform as to surface exposed to air, depth, etc. The entire contents of the jar was used in an individual test and the emulsion was readily broken down by transferring to a test tube and heating in hot water for several moments. The warm oil thus separated was poured through a dry filter and used in the tests of the peroxide value (see Table I). The peroxide values were determined by the method of Lea[1a].

Two olive oils secured at different times from the same source, designated as "A" and "B", were employed. In the case of oil "A", both a neutral and a slightly acidified emulsion (ascetic acid based on the aqueous phase of 0.13 per cent) were tested. In the case of oil "B", only the acid emulsion was used. In the latter case a control of the unemulsified oil was carried along for comparison.

The results of peroxide value determinations at varying time periods of

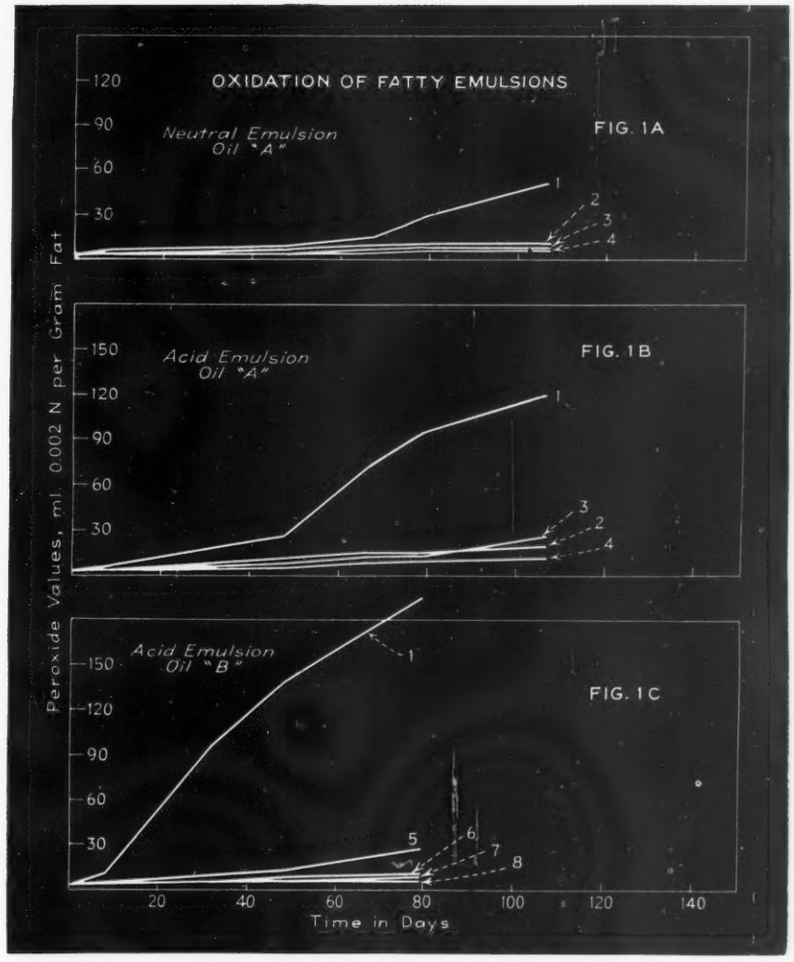

FIG. 1—OXIDATION OF FATTY EMULSIONS

Curve 1—Control (untreated)
Curve 2—Ascorbic Acid — 0.013 per cent
Curve 3—d-Gluco ascorbic acid 0.019 per cent
Curve 4—d-Gluco ascorbic acid—0.063 per cent
Curve 5—Unemulsified control
Curve 6—Reductone—0.05 per cent
Curve 7—Dihydroxy maleic acid—0.05 per cent
Curve 8—d-Gluco ascorbic acid—0.05 per cent

these emulsions are shown in Table I and the corresponding curves in Figs. 1-A, 1-B and 1-C.

The results in Table I, and particularly the corresponding curves in Fig. 1, graphically demonstrate the extent to which treatment with ascorbic acid compounds resulted in practical inhibition of peroxide formation. These results indicate, therefore, the extent to which rancidity was retarded in the various olive oil emulsions by the ascorbic acid compounds. In connection with these results, it is of interest to note the difference between the emulsified oil (curve 1) and the non-emulsified oil (curve 5) in Fig. 1-C. Here the large differences in the rate of peroxide formation and of rancidity development between bulk oil and emulsified oil due to enormously increased interfacial surfaces is apparent.

Comparison of curve 1 in Fig. 1-B, representing the emulsified control of oil "A", with curve 1 in Fig. 1-C, representing the emulsified control of oil "B", is also interesting as indicating the extent to which variations may occur between different batches of the same type of oil.

Mayonnaise and Salad Dressings

In a typical test, varying quantities of *d*-gluco ascorbic acid were dissolved in the vinegar before emulsification in the course of preparation of a commercial mayonnaise. Observations were then made after storage at room temperature on the control and the treated products as to peroxide value, Kreis rancidity test and color of the extracted oil. These results are recorded in Table II. It will be noted that with increasing amounts of *d*-gluco ascorbic acid, a greater degree of protection against rancidity is afforded. With 0.1 per cent of *d*-gluco ascorbic acid, such a degree of protection was observed that after 106 days the extracted oil showed a negative Kreis rancidity test, and the extracted oil

** *d*-Gluco ascorbic acid is an analogue of ascorbic acid (vitamin C). It has similar chemical properties but not the anti-scorbutic effect. This compound is at the present time under production for use as an anti-oxidant in foods and other products.

showed only little loss of color, whereas under the same conditions the untreated mayonnaise yielded an obviously bleached extracted oil of definite rancidity as judged by the Kreis test, and the mayonnaise itself was distinctly off-flavor.

Dried whole milk on exposure to air readily loses its milky flavor, becomes tallowy and rapidly develops rancidity. We have found that, if the ascorbic acid compounds are added to milk before drying, the protective anti-oxidant effect is carried over into the dried material.

Immediately after drying, the treated dried milk has a much fresher and milkier odor and taste than the untreated control milk. This fresh milky odor is retained for long periods even if stored in contact with air, the actual length of time depending on the extent of the treatment. Tables III and IV show the results of experiments in which whole milk was spray dried in the presence of *d*-gluco ascorbic acid. The results in Table III show that there is only slight loss of the added *d*-gluco ascorbic acid during the drying process.

In Table IV are the results of the stability tests conducted on this spray dried whole milk. These tests indicate the increased stabilization that may be expected through the use of these compounds.

Dried egg yolk on storage loses its eggy flavor and its color. The introduction of ascorbic acid compounds into the egg yolk before drying was found to retard this loss of color and flavor. The results are shown in Table V.

The flavor, keeping qualities and vitamin A content of butter, evaporated milk and other dairy products, may be improved by the introduction of these compounds into the aqueous phase of the emulsions as early as possible.

In pharmaceutical emulsions of fish oils, such as cod liver oil emulsion, these compounds will be found to retard or entirely prevent rancidity and destruction of vitamin A.

In connection with the marketing of frozen meats and fish, and other frozen foods which are subject to oxidation, the anti-oxidant and protective properties of ascorbic acid compounds could be profitably utilized. The use of an ascorbic acid wash or a protective ice glaze containing ascorbic acid is suggested for these products.

While not specifically concerned with rancidity, a patent[5] recently granted us covers the use of ascorbic acid compounds in improving the stability of beers and ales. The development of pasteurized taste and the formation of the so-called "oxidation haze" are inhibited, and as a result the market shelf life of the packaged beer is considerably prolonged.

Further indicated uses for these compounds will no doubt appear wherever a non-toxic, highly active, practically tasteless, water soluble anti-oxidant is needed. The ascorbic acid group of compounds seem ideally to combine these desired properties.

To summarize, the emulsification of a fat in foodstuffs is known to increase greatly its susceptibility to rancidity. Along with the development of rancidity there is a destruction of the fat soluble vitamins A and E. It is shown that rancidity and destruction of vitamins A and E can be retarded or prevented by introducing ascorbic acid (vitamin C) and related compounds into the aqueous phase of the emulsion. Results are presented showing the stabilization and flavor improvement of olive oil emulsions, mayonnaise, dried whole milk and egg yolk. Other uses such as the improvement of the keeping qualities of butter and other dairy products, pharmaceutical fish oil emulsions, frozen meats and fish are indicated.

Table III—Dried Milk

Loss of *d*-gluco ascorbic acid on spray drying

Amount added		Amount found after spray drying
Wet bases per cent	Calculated to dry basis per cent	Dry basis per cent
0.03	0.21	0.19
0.10	0.77	0.66

Table II—Mayonnaise

	Control			*d*-Gluco ascorbic acid—0.02 per cent			*d*-Gluco ascorbic acid—0.05 per cent			*d*-Gluco ascorbic acid—0.1 per cent		
	Perox. value	Kreis test	Color* of oil	Perox. value	Kreis test	Color of oil	Perox. value	Kreis test	Color of oil	Perox. value	Kreis test	Color of oil
Initial values	0.5	neg.	55.0	0.5	neg.	55.0	0.5	neg.	55.0	0.5	neg.	55.0
36 days standing	2.9	slightly positive	43.4	2.7	neg.	47.9	0.8	neg.	51.0	0.8	neg.	54.4
70 days standing	8.1	positive	39.6	8.0	slightly positive	48.7	5.9	neg.	49.4	4.5	neg.	50.9
106 days standing	11.3	positive	40.4	9.0	slightly positive	49.9	5.1	neg.	50.0	4.9	neg.	50.8

* The color is expressed as photometer readings of the sample in a ½ in. cell measured in light of wave length of about 4600 Angstrom units.

Table IV—Dried Milk

	Control			*d*-Gluco ascorbic acid—0.030 per cent			*d*-Gluco ascorbic acid—0.10 per cent		
	Perox. value	*Kreis test*	*Odor & taste*	*Perox. value*	*Kreis test*	*Odor & taste*	*Perox. value*	*Kreis test*	*Odor & taste*
1 day standing...	2.3	neg.	poor-stale tallowy	1.5	neg.	fresh milky	1.5	neg.	fresh-milky
15 days standing.	22.8	positive	& rancid off	3.8	neg.	milky	1.3	neg.	fresh-milky
30 days standing.	79.6	positive	odor	40.2	positive	stale	2.0	neg.	milky
50 days standing.	94.0	positive	....	74.0	positive	....	5.0	neg.	....

Table V—Dried Egg Yolk

	Control			Treated (0.1 per cent *d*-Gluco ascorbic acid)			
	Color of extracted fat*	*Kreis test*	*Perox. value*	*Color of extracted fat*	*Kreis test*	*Perox. value*	*Odor*
3 days standing.....	45.3	neg.	0	46.3	neg.	0	.....
24 days standing....	42.6	neg.	0	47.1	neg.	0	more egg-like than control
112 days standing...	31.5	neg.	5.7	42.0	neg.	3.9	more egg-like than control

* The color is expressed as photometer readings of the sample in a ½ in. cell measured in light of wave length of about 4600 Angstrom units.

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3. Newton, Oil and Soap **9**, 247, 1932, Grettie, *ibid.* **10**, 128, 1933.
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5. Gray and Stone, U. S. Patent No. 2159985, May 30, 1939.

Federal Surplus Commodities Corporation's food purchase stamps

U.S.D.A. Photograph by Purdy

Do We Want the STAMP PLAN? *Most Say Yes*

By IVAN C. MILLER
Distribution Editor,
FOOD INDUSTRIES

IN increasing amounts from year to year, the farmers of this country have been producing food in excess of the country's capacity to consume. Until recent years, exports removed the surpluses. Now they pyramid. Surpluses, in accordance with the law of supply and demand, often lower prices below the cost of production, thus threatening the existence of the farm population.

The country at large is not, however, overfed. A large portion of the total population does not consume sufficient food of the proper kind to constitute an adequate diet. Many are under-nourished. This has become a national problem, because malnourishment weakens a nation physically and morally. Lack of sufficient food, even among a portion of the people, breeds disease and crime.

Of the two groups, the farmers without a profitable market and the "under-privileged" with no money to buy, the farmers have been by far the more vocal in proclaiming their woes. They are numerous and politically strong. Their pleas caught the national ear. Farmer subsidy was the result.

A number of plans were introduced to subsidize the farmer, stabilize price and prevent the accumulation of surpluses. In 1921, 1922 and 1930 protective tariff acts attempted to boost domestic prices of farm products. The plan of the equalization fee experiment (1922, '27 and '28) was to move surpluses through export subsidies while boosting domestic prices behind the tariff walls. The export debenture plan of the same period differed from the equalization fee only in that it would raise money for payments to farmers on import duties rather than from farm products.

Rochester food stores use window displays to advertise and spread the movement of surplus foods

In 1929, the Federal Farm Board organized to improve marketing conditions—and thereby to rectify prices—through sponsoring farm marketing cooperatives on a nation-wide scale. Failing to bolster prices through aid to co-ops, the Farm Board began buying cash crops and futures—lost $345,000,000.

The domestic allotment plan of 1932 proposed that a farmer should be paid a bonus on his *pro rata* share of the domestically consumed crops and that he sell the rest abroad for whatever he could get.

The first AAA in 1933 set up the first control over acreage, attempted marketing controls and levied processing taxes to meet costs. AAA was knocked out in Supreme Court in January, 1936.

Following these attempts came the soil conservation program in 1936, which undertook acreage reduction by paying out $500,000,000 a year, ostensibly for cooperation in saving the soil. In 1938, the second AAA came into being, retained the soil conservation program and added to it storage loans for compliance with acreage quotas, set up a new system of marketing quotas in time of excessive surpluses, embodied the ever normal granary, crop insurance for wheat, parity payments to cooperating farmers and large scale distribution of surpluses through relief.

The new plan for moving surpluses, and thus stabilizing farm prices, differs from the other plans in many ways. It takes direct recognition of families on relief and a portion at least of the rest of the "under-privileged

third". One of the outstanding differences between the stamp plan and its forerunners is that the conceived plan is not being dumped out as a finished product. The plan is undergoing laboratory tests before general adoption. It was first introduced in Rochester, where imperfections in the plan could be noted before introducing it in other communities. The plan is now being tested in seven communities scattered over the country.

The stamp plan is a plan to remove food surpluses and malnutrition in one act. It is a plan to give the under-fed and under-nourished a chance to eat the farm food surpluses. The eligibles in the test cities represent 40,000,000 people in the United States whose average cash income is $9 per week and who each spend about 15 cents per day for food. Under the stamp plan, those persons receiving public aid are allowed to purchase a minimum of a dollar's worth of orange stamps per week for each member of the family. These are good for the purchase of any food at any grocery store. For every dollar's worth of orange stamps purchased, they are *given* 50 cents worth of blue stamps which can be used in any grocery store to purchase at market prices only those foods designated by the Federal Surplus Commodity Corporation as surplus farm products. Retailers cash stamps at banks or post offices, or with wholesalers.

The mechanics of the operations are simple. The results are promising. Most of those affected by the plan approve it.

As long as farm surpluses move to market with a profit to the farmer, the farmer is agreeable. He would be better satisfied with a larger profit. Nevertheless, he is happy to see the surpluses dwindle.

Prior to the introduction of the stamp plan, surpluses were bought by Federal Surplus Commodity Corporation and distributed to relief families through welfare agencies. Now, wholesalers and retailers in the towns where the stamp plan is being tested receive a profit on surplus foods going to relief families in stamp plan cities. They are both delighted.

Each food manufacturers' products compete with all food products. Therefore, what has been the effect of the stamp plan on the sale of manufactured food products in stamp plan test towns? After several months' test in Rochester, the total food sales have increased beyond the amount represented by blue stamp surplus commodity purchases. During the first nine weeks of the trial, food sales of stores in low income areas were 12 per cent higher than during the four weeks prior to the introduction of the test. Deducting surplus stamp purchases, sales were up 6 per cent.

In intermediate income neighborhoods, total sales were up 9 per cent, up 5 per cent allowing for blue stamp purchases. Stores in upper income sections indicated no change.

Rochester relief family purchases of orange stamps are voluntary purchases. Forty per cent more families purchased stamps the second pay period than the first pay period. Apparently those eligible to purchase orange stamps and receive free blue stamps, exchangeable for surplus farm commodities, approve of the plan.

Housewives like the plan, too, because money for food is provided for on pay day to last until the next pay day. Food comes first. Food is certain. Relief families who were receiving surplus food commodities direct from relief agencies prefer the stamp plan. Under the stamp plan, food is obtained in a normal way through grocery stores. Purchases are made as needed of the foods required at the time. Waste and spoilage are avoided and a more satisfactory selection is assured. The stamp plan is less like the dole than relief donations.

The government likes the plan too. After all, it is the government's plan and it looks like a better plan than any conceived before. It promises to relieve surpluses and, at the same time, to feed better those in need of food. The government is unquestionably pleased that the plan has the endorsement of farmers, distributors and those on relief.

The taxpayers are the only group not so sure of the stamp plan or for that matter any plan. However, if the government is going to spend one-half billion dollars to relieve farm surpluses, and as long as the taxpayer foots the relief bill, it makes little difference how purchased food surpluses reach those on relief.

The taxpayer is, however, concerned as to whether or not he is paying, from his own pocket, the distributor's profits on surplus food commodities. He realizes, however, that the cost of distribution must be paid, whether the surpluses go through one channel or another, and he consoles himself that more than likely the cost through regular retail channels is no more than through welfare and relief agencies.

The general opinion is that, if farmers must be subsidized by purchase of their surpluses, and as long as relief must be provided for the unemployed, the stamp plan is the best plan thus far devised.

Percentage Distribution of Commodities Secured with Blue Stamps in Five Cities

May 16 — Aug. 26, 1939

Commodity	May 16 — July 15			July 16 — Aug 26					
	Rochester	Dayton	Seattle [1]	Rochester	Dayton	Seattle	Birmingham	Shawnee [2]	Estimated National Average [3]
	1	2	3	4	5	6	7	8	9
	Percent								
Butter	33.1	25.6	33.5	30.0	19.3	33.2	15.0	11.9	23.4
Eggs	30.7	26.6	33.7	27.3	25.3	29.4	19.7	12.4	24.7
White Flour	8.1	9.7	13.7	7.7	6.3	8.2	20.7	25.1	10.1
Graham Flour	.07	.1	.7	.07	....	.4	.16	.26	.06
Total Flour	8.17	9.8	14.4	7.77	6.3	8.6	20.86	25.36	10.16
Corn Meal	.5	2.1	1.0	.4	2.0	1.0	6.8	5.9	2.2
Rice	....	....	....	1.4	2.6	2.2	3.6	4.4	2.4
Dry Beans	2.4	4.0	4.7	1.4	4.3	2.2	6.2	10.3	3.8
Dried Prunes	2.0	2.7	3.4	1.1	2.1	2.2	2.7	6.2	2.2
Oranges	19.4	22.1	4.3	....	....	....	....	....	....
Grapefruit	3.7	7.1	5.0	....	....	....	....	....	....
Peaches	....	....	....	9.3	12.0	8.6	8.0	11.6	10.3
Pears	....	....	....	1.0	2.5	1.0	2.6	.8	1.7
Total Fresh Fruits	23.1	29.2	9.3	10.3	14.5	9.6	10.6	12.4	12.0
Cabbage	....	....	....	3.7	3.5	1.0	2.8	4.2	3.3
Peas	....	....	....	2.3	4.5	1.5	3.7	.8	3.0
Tomatoes	....	....	....	10.9	10.8	7.0	5.9	3.6	9.3
Onions	....	....	....	3.4	4.8	2.1	2.1	2.5	3.6
Total Fresh Vegetables	....	....	....	20.3	23.6	11.6	14.5	11.1	19.2
Total Fresh Fruits and Vegetables	23.1	29.2	9.3	30.6	38.1	21.2	25.1	23.5	31.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

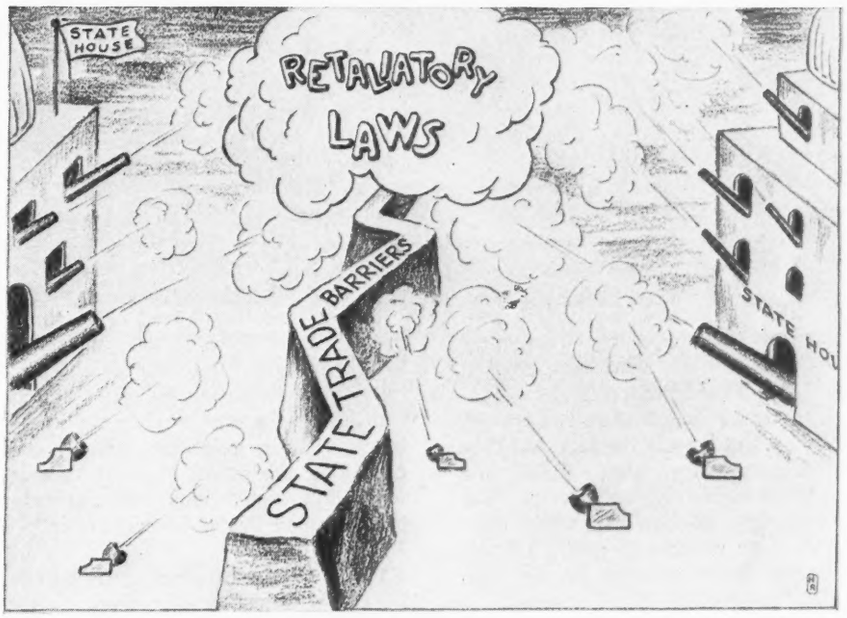
[1] Seattle data during this period inadequate.
[2] First half-month of program only.
[3] City distribution weighted by the number in May, 1939, receiving public assistance in states surrounding these cities.

Source of data: Economic Analysis Section, Stamp Division, Federal Surplus Commodities Corporation, Sept. 15, 1939.

Food Manufacturers *Must Act to Wipe Out* TRADE BARRIERS

By IVAN C. MILLER
Distribution Editor,
FOOD INDUSTRIES

EDITOR'S NOTE: *For previous articles in this series see the following numbers of* FOOD INDUSTRIES: *"These Chinese Walls Will Choke Your Business," July, 1939, page 390; "State Regulations Steal Food Markets," August, 1939, page 444; "Laws Forced by Farm Groups Halt Trade in Processed Foods," September, 1939, page 500; and "Competitive Interests Push Food Trucks Off the Highways," October, 1939, page 555.*



Let's end our own war first.

VARIOUS types of laws, passed by all of the States in the Union, which erect barriers to the free flow of interstate trade have been discussed in the four preceding issues of FOOD INDUSTRIES.

The state laws passed by dairy states, limiting and often virtually prohibiting the sale of margarine, were probably the first barriers erected against the free flow of interstate trade. These laws were passed to protect butter, a product of the dairy states, from the competition of other types of spreads. The presumed results, as viewed by the dairy states, is very likely responsible for the passage of a multitude of laws which protect the dairy interests of each dairy state from the competition of other dairy interests in other dairy states.

Fruit and vegetable producing states have used the same strategy to curb the competition of other fruit and vegetable producing states by passing rigid license, quarantine and inspection laws and regulating size and shape of containers. Container standardization has removed a few of these barriers; however, too many still remain to throttle free trade.

Probably no group of laws (both state and municipal) restrict free trade more than those regulating and taxing transportation by trucks. Unquestionably, the cost of restrictive regulations, fees and taxes must be borne by those products transported by truck and paid for by the consumer. The laws of some states, those aimed at private carriers (food manufacturers' own trucks), if adopted by other states will threaten the existence of many food manufacturers.

It is not difficult to understand the origin of these laws. They are born of the instinct of self preservation and mothered by Dame Retaliation. The instinct of self preservation has often promoted acts of self destruction. Retaliation's profits are broken heads. There is no lasting profit in war.

Few there are who cannot feel sympathetic with the housewife whose busy days are interrupted by insistent book agents and door-to-door peddlers. Few there are who do not approve when the local Chamber of Commerce brings pressure on the City Fathers to legislate against peddlers whose sale of rugs, lace, notions, "take local money out of town", "increase local unemployment", and "destroy the market for the local merchant."

Throughout the land it seems to be a characteristic of municipalities to endeavor to protect local business from the inroads of the itinerant. It is but natural that the righteous views of the municipalities regarding the

PUBLIC RELATIONS IN THE Food Industries

itinerant should spread to the state. The result is that numerous state and municipal laws today legislate against the itinerant peddler.

These laws aimed at itinerants, to be effective, must be broad at the base and therefore must include many business activities against which the law was not primarily directed.

BESIDE laws actually prohibiting the activities of itinerants, tax laws, license regulations and other measures have been employed to curb or remove the itinerant who travels by truck as well as those who go on foot. These laws curb the activities of the truckers who are moving more and more of the farm produce to market.

This type of itinerant is responsible for an increasing portion of farm produce distribution, because such truckers frequently buy for cash in the field and assume the responsibility for distributing the products in markets often several states distant from the field.

When the activities of these truckers are curbed, due to municipal or state laws, the farmers whose markets are dammed up demand from their own states or municipalities retaliatory laws against those who have stopped the flow of their products.

The most unfortunate aspect of trade barrier laws is the fact that they breed retaliatory laws. Each law begets a prolific laying of eggs. Unlike the eggs of some fish, which must be layed by millions to produce a few progeny, almost all trade barrier eggs hatch.

The attitude of locals against competition from without is not confined to a dislike for itinerants. Farmers supplying grain to the local brewery reason that, if the import of beer from neighboring states could be prohibited, the local brewers' output would increase and likewise the market for local grain. The farmer's voice in the halls of legislatures is like a chorus of sirens, for in the legislatures the farmer is numerous. So a law is passed. Outside competition is stifled —but only temporarily. Penalized neighboring states pass retaliatory laws, the local brewers' sales decline —also the local farmer's market for grain.

Once these trade barrier laws are passed, they are tenacious of life. Attempts to remove them often result in the hatching of additional trade barrier laws. During the first week in April, 1939, in Chicago, the Council of State Governments held a "National Conference on Interstate Trade Barriers." At the close of the conference the following resolutions were adopted:

"Whereas the increase of interstate trade barriers and the passage of discriminatory legislation by the states has resulted in the adoption of retaliatory legislation, in contravention of the spirit of the Union and the welfare of the people thereof, and

"Whereas these practices by the several states place additional burdens upon the consumer and as such must inevitably postpone the return of our national prosperity and result in lower standards of living in this country,

"Now therefore be it resolved that the National Conference on Interstate Trade Barriers declares itself to be unalterably opposed to the erection of these discriminatory trade barriers, and

"Be it further resolved that this conference recommend that the states return to the traditional American policy of free trade among the states, in order that the consumers and producers of the nation may buy and sell without legal discrimination, either as to the place of origin of goods, the method of transportation or the efficiency of the producer."

It was further resolved to continue the important work of the conference by discouraging the adoption of any retaliatory legislation by states which feel themselves aggrieved by the legislation of their neighbors, and by encouraging the repeal of trade barrier legislation which may have already been adopted by the several states.

SINCE this conference of the Council of State Governments, many new trade barrier laws have been introduced before the legislatures of many states. Instead of annulling its trade barrier laws against margarine, the State of Wisconsin introduced two new bills in an attempt to expand its drastic margarine laws to other fats.

Wisconsin bill (S-434) prohibits consumers from the mixing of any ingredients to thereby prepare their own margarine or spread. This bill has become law. Another bill (S-21) would extend the present Wisconsin oleomargarine law to include cottonseed oil, shortening, lard substitutes.

This bill was reported unfavorably by the Senate Committee on Agriculture and Labor, but was then referred to the Judiciary Committee of the Senate. No further action has been taken on this bill. However, the legislature still remains in session.

The sequel to Wisconsin's attempt to legislate further against margarine and the fats from which it is made was the act of Georgia's director of the Department of Public Welfare who, on Oct. 4, ordered the Federal Surplus Commodities Corporation to stop distributing Wisconsin dairy products to relief clients in the State of Georgia until the state (Wisconsin) withdrew its tax on oleomargarine.

One of the far reaching effects of trade barrier legislation is already in evidence. This effect should be disheartening to many food manufacturers. When a state or group of states hinders free trade in the products of another state or group of states, the latter retaliates in two ways: one, by hindering the free flow of products of the first state or group of states through retaliatory trade barrier laws; and the other, by producing in their own state or states the products normally produced by the first state or group of states.

Cotton states are retaliating against dairy states and corn-hog states which legislate against margarine made of cottonseed oil by entering dairy and corn-hog farming and processing of the products themselves.

Possibly this decentralization of food production and attempt at regional self-sufficiency may in the end prove beneficial. However, the results can only be disastrous to present food manufacturers.

It is apparent that removing these state obstacles to free trade is a task which requires the interest and effort of more than the legislators. Food manufacturers must shoulder their responsibility. Their efforts to remove these barrier laws require the support of producers and growers, whose influence on legislatures has been in a large measure responsible for the enactment of these laws. They have been misguided. Their losses from trade barrier laws are greater than their gains. They should be allied with the manufacturers.

Wholesalers and retailers have much to gain from the removal of the barriers to free trade. Excessive costs of distribution raise prices, reduce sales and profits.

THOSE who will benefit most from the removal of trade barriers, however, are the consumers who bear the burden of excessive cost of distribution and the food manufacturers whose markets are shrinking as a result of these laws.

Consumers can and should be allied with food manufacturers in an effort to wipe out all barriers to free internal trade.

Removal of trade barrier laws is a worthy objective for the efforts of so-called "consumer groups" whose energies are too often directed against food manufacturers. Herein are feasible objectives for the food manufacturers' public relations program.

RICE SUBSTITUTE Made from WHEAT

Research and experiment in Hungary turn surplus grain into satisfactory substitute for imported food

By E. SINGRUEN
Consulting Cereal Chemist, New York, N. Y.

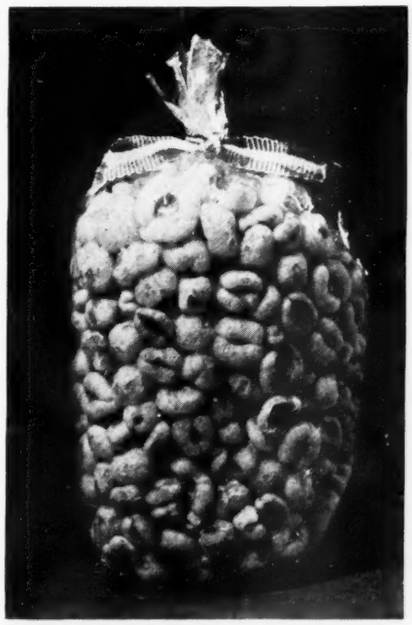
This rice-like product was made from wheat by a new process developed in Hungary. It can be used to replace rice in most recipes. It can also be given additional processing for conversion into a puffed breakfast cereal, and can be used in candy and other products in place of nuts.

BASED on a Swiss process for peeling wheat, the Istman Malone Mills, Debregen, Hungary, have developed a rice-like product made from wheat and called "Buris" (wheat-rice), which the writer saw during a European trip this past summer. This product has been changed sufficiently in its physical and chemical properties so that it can be used in most recipes to replace rice. The flavor, after cooking, is said to resemble closely that of natural rice.

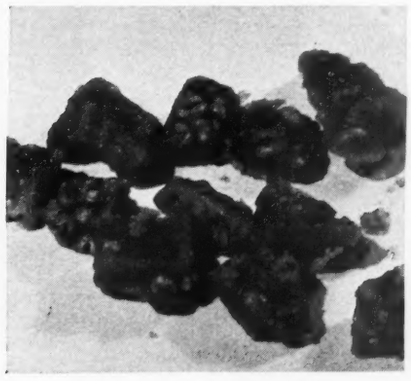
While the development of such a product has no immediate application in the United States, where rice is plentiful, it may eventually hold economic significance for this country, which exports both wheat and rice.

Preference for rice on the part of Hungarian consumers provided an economic reason for this development. This preference caused Hungary to import increasing quantities of rice in recent years. But war in China, exchange difficulties and the increasingly disturbed state of European trade, made the continuance of adequate rice imports impossible.

As a first expedient, Hungary turned to rice growing. Experiments in rice culture are under way on a small scale and promise to satisfy at least some part of the rice demand. But such experiments take time and may not prove to be successful.



Puffed breakfast cereal made from the new wheat-rice looks not unlike the familiar American product.



In candy, the rice-like product made from wheat imparts flavor and "crunchiness."

However, Hungary produces a considerable surplus of wheat beyond its own needs. So recourse was had to the development of a process by means of which this surplus wheat could be made to replace rice imports.

The Swiss process, already mentioned, had been originally developed to remove the skin of the wheat berries, in order to produce a whiter flour. By experimenting with this process, the developers of "Buris" found that a useful rice substitute could be produced.

The first samples of the new product, pictured herewith, were shown to delegates to the Sixth International Congress of Chemistry and Technology in the Agricultural Industries, held in Budapest last July. At that time, the following analysis of the product was given:

Water	11.21 per cent
Ash	1.14 per cent
Protein	11.48 per cent
Fat	1.52 per cent
Fiber	1.03 per cent
N free	73.62 per cent
Starch	65.70 per cent

In addition to its use in replacing rice in cooking, the new wheat product can, by additional processing, be made into a puffed breakfast cereal. It also finds use in candy and other products as a substitute for nuts.

New Packages & Products

THE recently introduced polymerized rubber package material is finding applications in the food industry's packaging. These applications extend over a wide variety of food products. Different attributes of the packaged material are employed for different food products. Following are some applications of the polymerized rubber package materials in the food industries.

Confections

The new product of Confections, Inc. is marketed in a transparent polymerized rubber bag, heat-sealed to form two bags, one inclosing the other, both moisture vapor-proof. The product "Snacks," a caramel coated popcorn crunch, must be kept free from moisture to preserve its cripsness.

Tas-T-Nut, product of Tas-T-Nut Company employs polymerized rubber package material for shelled nuts. The package, designed for counter display to stimulate impulse sales, consists of a transparent air-tight bag of polymerized rubber, reinforced by paperboard. This transparent package permits inspection of the product and protects it from air and rancidity.

The transparent bag used by Curtis Candy Co., Chicago, for bulk candy in consumer packages is of polymerized rubber package material. The packaged material, though it protects the contents from staling, is transparent and durable.

Cheese

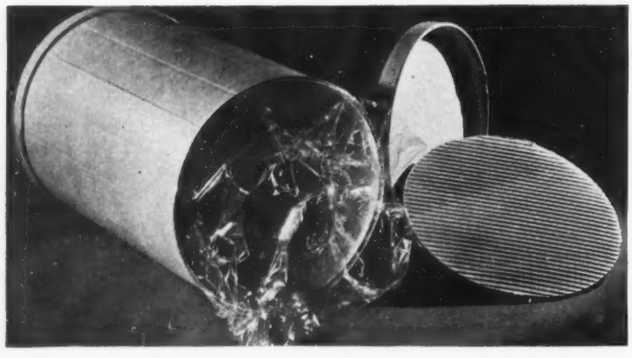
A number of cheese products, as shown in the illustration, are packaged in polymerized rubber. The package material protects the product from moisture losses and is not affected by the fat in the cheese.

Frozen Foods

A collapsible fiberboard container of cylindrical shape lined with polymerized rubber is now being used for storage of frozen foods. This type of package is primarily an inter-industry or institutional container, used for packaging 5, 10 and 30-lb. quantities of frozen foods and vegetables. The outer fiberboard container furnishes support for the liner, which is heat-sealed to form a moisture vapor-proof inner package.

Coffee

Polymerized rubber-lined paper bags are in use as coffee packages. The roasted ground coffee in these bags is preserved by heat-sealing after exhausting the air to form a vacuum inside the package. The heat-sealed polymerized rubber package material maintains the vacuum.



Hints and Hurdles

Food Technology Finds a Way

PACKERS of Atlantic Coast crabmeat have always been handicapped in attempting to gain a market away from the seaboard. The introduction of canned West Coast and Japanese crabmeat in Eastern markets, more than ever placed East Coast crabmeat behind the eight ball.

East Coast crabmeat, though choice in flavor and texture, is also delicate. It has for years defied all attempts to preserve it sufficiently for it to enter regular channels of distribution. Until recently, it has been confined to the limits of the "fresh" markets nearer the seaboard. The East Coast crabmeat contains a copper salt which causes the white flakes to darken soon after removal from the shell. In spite of the precautions of packers, East Coast crabmeat has continuously run afoul of the Food and Drug Administration. Seizures and destructions have been costly to the industry.

For many years attempts have been made to can this product—without success. Five years ago, one East Coast packer placed the problem in the hands of a food technologist for solution—a food technologist trained in chemistry, engineering, bacteriology, dietetics, economics, food distribution, and other necessary sciences. After four years of scientific study, a process was developed for successfully canning Atlantic Coast crabmeat. The new product, canned "Harris American Crabmeat," is on the market. It is the product of Blue Channel Corporation, Centerville, Md. The canned product has met with acceptance in the area east of the Mississippi—in many sections where Atlantic Coast crabmeat was never before known.

For eleven years, FOOD INDUSTRIES has advocated the employment of trained food technologists for the solution of food processing problems. Almost no skilled food technologists have been available to the industry. Now, however, several of our universities have introduced into their curriculum complete courses in food technology. Other universities will follow the pioneers. Soon competently trained food technologists will be available to tackle and solve many of the food industries' most knotty problems.

How to make a better product, how to make it less costly, how to do what has never before been done—these will be their problems.

A food technologist, through a scientific approach, solved the age-old unsolved problem of the crabmeat industry. Scientifically trained food technologists can solve many of the remaining unsolved problems of the food industry and new ones which will arise. But the food industries must abandon complete reliance on practical kitchen formulas and methods, and open its doors to these new technicians. The food industries should make a place for these newly trained technologists as they come from their universities, not at the top as advisers and consultants, but in the plant where they come face to face with the real problems of the industry.

Watch This Infant Industry

A TABLE in the October, 1938, issue of FOOD INDUSTRIES, p. 590, listed the known locker plants at that time by states. The state of Illinois then had 60 locker plants. A year later comes a report from the University of Illinois which states that there are now 100 locker plants within the state, equipped to handle a quantity of meat equivalent to that of 100,000 hogs, in addition to poultry, fruits and vegetables.

The locker plant conference held at the University of Illinois, Oct. 26 and 27, discussed the preparation of poultry for storage, curing and smoking of meat that is to be placed in locker storage, engineering problems, processing of fruits and vegetables, salesmanship, advertising and the economy in the use of locker plants. An infant industry which will eventually provide real competition to many food manufacturers is showing progress.

At Last A Spring Board

THE Robinson-Patman Act was passed in 1936. Since then manufacturers have been watching the results of cases before FTC for a decision to guide them in setting up a cost accounting system to determine prices for quantity purchases. The Standard Brands case is a good spring board from which to take the plunge of setting up a cost accounting system to determine quantity discounts.

The scientific application of food technology developed a process for the successful preservation of Atlantic Coast crabmeat in cans after many practical approaches to the problem had failed.

Food DISTRIBUTION

Articulated tractor-trailer in a turning position. Note that in turning, the rear edge of the wing extends back so that it partially covers the center one of the three side doors. That the door latches of the two forward doors will not be torn off in turning, the wings contact horizontal top and bottom rubbing strips which extend out from the sides of the body. To prevent the aluminum of which the wings are made from wearing through in turning, the wings are lined on the inside with strips of stainless steel at the same heights as the rubbing rails on the trailer body.

"ONE-PIECE" Tractor-trailer Enters Food Field

Panels cover space between cab and trailer to improve appearance and increase advertising space.

WHEN Cincinnati threatened to pass an ordinance prohibiting the use of tractor-trailer units on down town streets, the Matthews Frechtling Ice Cream Co. of that city equipped its new tractor-trailer ice cream route truck with "wings."

As the name implies, the wings are vertical metal panels which cover the conventional space between the rear of the tractor cab and the front end of the trailer body. The tractor and trailer thus give the appearance of one complete unit regardless of the angle at which the trailer is turned or the unit is jackknifed.

Food **DISTRIBUTION**

And thus the first articulated tractor-trailer ice cream route truck was born into the field of motorized food transportation. While ultra-modern truck body designers have proposed means of closing the gap between tractor and trailer to reduce wind resistance and cut fuel consumption on long runs, it remained for the Matthews Frechtling company actually to put into service the first such unit—and for an entirely different purpose.

In fact, the Matthews Frechtling company gave no thought to the reduction of wind resistance in the original design of the wings. The basic idea behind the tractor-trailer unit was to provide a vehicle in which the ice cream would be available at a level 39 in. above the ground for easy unloading and of large enough carrying capacity to eliminate constant shifting of the load. Both results have been obtained in the new vehicle, and the wings have proved so satisfactory in operation that they may lead to a much wider application of the idea in other branches of motorized food transportation. Aside from making the tractor-trailer combination appear as one unit, the wings may yet be utilized to reduce wind resistance as an aid to lessened fuel consumption on long overland hauls.

Other advantages of the vehicle include increased advertising value to

such an extent that it is considered a moving billboard on the highway, and a reduced investment cost as compared with conventional 1½- to 2-ton trucks of half the carrying capacity. The Matthews Frechtling company considers the unit so successful that it is constructing another of exactly the same size and type.

The combination pictured herewith is made up of a Mack cab-over-engine tractor and a Trailmobile semi-trailer. The overall length of the unit is slightly in excess of 23 ft. 6 in. The body is of the three-hole type; is fully insulated and is refrigerated by a Kold-Hold system to maintain a sub-zero interior temperature. In operation, the body carries a total of 450 gal. of ice cream. The vehicle is run on a regular ice cream route of 100 miles per day with one-man operation.

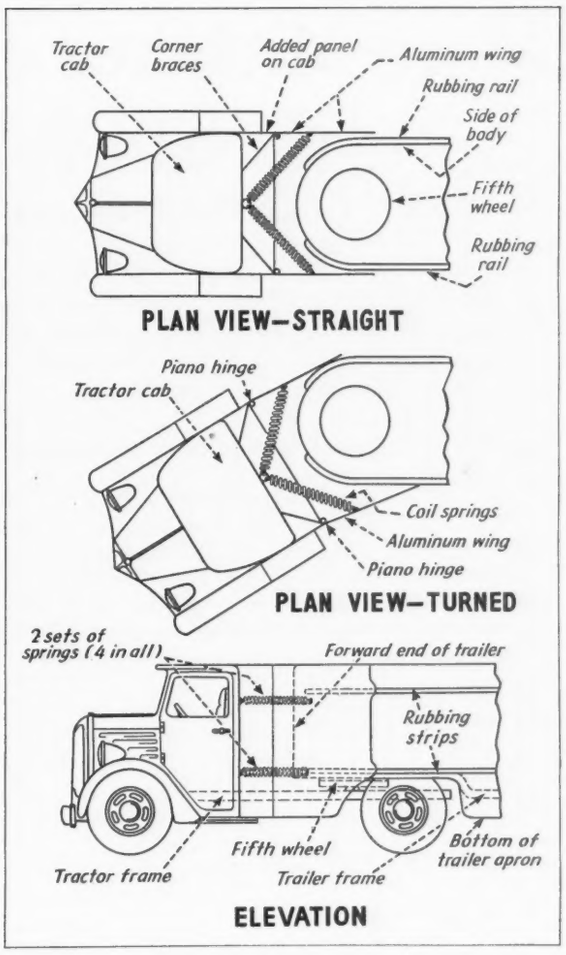
As shown in the accompanying illustrations, the wings are sheets of aluminum which are fastened at their forward vertical edges to the rear edges of metal panels extending backward from the rear corners of the tractor cab. The rear ends of the wings are held in contact against the sides of the trailer by means of four tension coil springs positioned as shown in the accompanying sketches.

The constant tension provided by the coil springs holds the rear edges of the wings against the sides of the trailer body, regardless of the angle between the tractor and the trailer when turning. The wings are long enough so that the wing on the outside of the turn will continue in contact with the trailer body when the tractor is turned at its shortest turning radius.

As shown in the two plan view sketches on this page, the short side and roof panels which extend backward from the cab are cross-braced in each corner to better support the weight of the wings. These were made of aluminum for lightness and to prevent rusting at the connection between the wings and the side panels. These connections are in the form of piano hinges for neatness and the absence of hasps or other outside projections. The bottom rear of the wings is curved to match trailer skirt.

The front end of the trailer is semi-circular in shape, with a radius of one-half the width of the body so that the nose does not foul the tension springs when turning.

The wings were designed by Gustave Windgassen, transport engineer and maintenance superintendent of the Matthews Frechtling company. The wings are not patented and so can be used by other concerns in the food field without infringement.



Two plan views and one side view showing details of the wing construction. Note that the angle rubbing rails on the sides of the trailer body are tapered on their front ends so that the wings will lay close to the body in the turned positions. Note also the vertical and horizontal positions of the two sets of double coil springs which keep the wings in contact with the sides of the trailer body no matter what the angle between the tractor and the trailer.

Straight side view of the new articulated tractor-trailer ice cream route truck as operated by the Matthews Frechtling Ice Cream Co., Cincinnati.

The side wings which distinguish the vehicle by closing up the gap between the tractor cab and the nose of the semi-trailer are almost unnoticeable.

More Mistakes To Avoid in Packaging

PART IX

EDITOR'S NOTE: *This concludes the series, which began in March, 1939*

EVERY EXAMPLE is based on actual errors of packaging. Publication of the negative aspects of packaging is frequently more informative than the mere statement of a bunch of rules to follow. Particularly is it important to bring out the reasons why, and the automatic penalties that develop because of making mistakes.

251 **Using Obsolete Tools Caused Waste**—A food shipper who was reinforcing his export shipments with flat steel bands found that the man operating the strapping tools could not always keep up with production. It was found that the tools used were purchased ten years before and were now obsolete. A new strapping machine was installed, incorporating tensioning, sealing and cutting mechanisms with an automatic seal feed. This tool was mounted on the conveyor and a coil of steel strap was placed just below the conveyor rolls. Hence a natural loop of strap was formed for each package as it came down the conveyor. With this new equipment, the operator could reinforce three times as many packages per day as before.

252 **Used Old Spray Barrels**—In at least two instances, we have observed pickles and cider packed in old barrels which had previously contained a spray mixture for spraying orchard trees. In one case, this led to a serious illness arising from the lead and arsenate mixture which still remained in the barrel. Technically speaking, of course, this should be called a mistake of packaging, but it has other aspects as well.

253 **Wrong Type of Inside Enamel**—A certain canner had "R" enamel, "C" enamel and Plain cans on hand. He decided to pack a moderate quantity of peaches. Thinking that, because peaches were a fruit, they should necessarily be packed in enamel cans, he used both "R" enamel and "C" enamel cans for the product. In a short time, a good portion of both types of cans showed pinholes. Had he inquired from the can company with whom he had contract as to the proper container for peaches, he would not have had this loss.

254 **Failure to keep up-to-date** on sealing machines kept one manufacturer's costs unnecessarily high. He sends out thousands of corrugated boxes every day but these include a great many different sizes. And these different sizes come over conveyors from the packing department in an indiscriminate mixture. Accordingly he has always sealed them by hand because several years ago, when he investigated sealing machines, he found that the existing machines would have to be manually adjusted—side to side, and top to bottom—for each new size of box. Therefore he gave up the idea.

But he did not know that there is a new model of automatic top and bottom sealer which has almost instanteaneous automatic electrical adjustments, both side-to-side and top-to-bottom. This new sealer is able to take his boxes and adjust itself for each size as fast as the containers come from the conveyor.

255 **Improper Process Change**—A canner was processing tomatoes and allowing the cans to air cool after the process. To speed up production, he decided to water cool the tomatoes so that they could be cased directly upon emerging from the cooling canal. He neglected, however, to increase his cook to the point where sterilization was completed during the process. He experienced considerable loss.

256 **Absence of Proper Conveyors**—Rubberized canvas belt, sliding over a solid plate, was installed in the conveyor work tables of a plant making sauces. When a bottle of sauce was broken, although the material was immediately wiped up, enough of it would get under the belt to cause it eventually to stick to the plate. Also, since the sauce had an oily base, the rubberized belt became softened, increasing its tendency to stick. Friction built up in this way overloaded the motor, so that fuses frequently blew out and the whole line was stopped.

It was necessary to redesign the conveyor so that the belt ran on rollers, with anti-friction bearing, spaced 6 in. on centers. As a result the belt now always rides freely, in spite of any spillage that may occur.

257 **Storage Was Too Dry**—Complaints were received about a certain grease-proof paper wrapper. It was hard to handle and would crack and tear when being wrapped about the product. After the paper was stored under high humidity, to condition it before use, no more trouble was experienced.

258 **Rubbing Clouded Transparent Wrapper**—Complaints were received from customers concerning the cloudy condition in which the outer transparent cellulose wrappers of packages were received. This trouble was first blamed on the cellulose. But it was later found to be caused by improper packing of the shipping containers. When the wrapped packages were packed in the containers so as to avoid motion and rubbing during transit, the trouble disappeared.

Food Technology

NEW DISCOVERIES & INVENTIONS

FOOD TECHNOLOGY

Determining Vitamin C in Colored Solutions

ASCORBIC ACID (vitamin C) can be determined in colorless solutions by titrating with 2, 6-dichlorophenolindophenol and determining the end point by the appearance of a faint pink color. This visual method cannot be used in colored solutions, but by plotting a titration curve using an electrometric titrimeter to measure the oxidation-reduction potential, a break shows the end point. This method checks well on pure vitamin C with the usual visual method. It can be used on such highly colored solutions as strawberries and tomatoes.

Digest from "Determination of Ascorbic Acid: Electrometric Titration Method," by Mary Mann Kirk and Donald K. Tressler, *Industrial and Engineering Chemistry*, (Analytical Edition), 11, 322, 1939.

Bacteria In Candy and Jam

MICROFLORA isolated from a variety of candies and jams revealed many kinds of organisms, depending in part on the composition of the product. Thus, chocolate confections contained molds (*Penicillium glaucum* and *oleraceum, Aspergillus albus*) and bacilli (*B. proteus, B. subtilis, B. megaterium*). Nut candies contained organisms commonly found on nuts, especially molds such as various strains of *Mucor* and *Penicillium*. Milk or cream confections contained yeasts and lactic acid bacteria. Most of the bacteria isolated from confections were organisms capable of fermenting sugar and decomposing proteins.

Digest from "Microflora of Soft Candies and Jams," by A. N. Korkina, *Voprosy Pitaniya* 8, 111, 1939 (Published in Russia).

Qualitative Test For "Ethyl" Vanillin

ETHYLPROTOCATECHUIC aldehyde (Bourbonal, Ethvan, Ethylvanillin and several other names) has a flavor 3 to 4 times as strong as vanillin or standard vanilla extract, and is often used to fortify the true extract. Usually several grams per gallon are used. Up to now there has been no method of determining if true vanilla extract has been fortified by "ethyl" vanillin. This new test will detect the presence of ½ gram per gallon—an amount considerably less than the quantity needed to fortify the extract.

The method is a modification of a test devised by Stadler and Wagner (*Zeitschrift für Analytische Chemie*, Vol. III). The test is specific for "ethyl" vanillin, giving a violet color, whereas in its absence the color is dirty yellow. Variety of beans does not contribute interfering substances. Nor does interference arise from coumarin, heliotropin or several commercial "vanillin esters."

The test is critical however, for traces of ether, alcohol and too strong HCL will also give positive tests. The complete paper, including details, is to be published elsewhere.

Digest from "Qualitative Test for Ethyl Vanillin in Vanilla Extract," by Howard W. Chenoweth, Virginia Dare Extract Co., Brooklyn, N. Y. Read before Flavoring Extract Manufacturers Association, New York, June, 1939.

BAKING

Improving Baking Quality of Flour

WATER-SOLUBLE CELLULOSE ETHERS are useful for improving the baking quality of flour, when added to the flour or dough in small proportion. The invention is disclosed in German Patent 675,657 (granted May 13, 1939, to Ernst Buhtz, Hirschberg, Germany). Among the effective agents are methylcellulose, ethylcellulose, chloromethylcellulose and chloroethylcellulose. As little as 0.125 per cent. calculated on the weight of flour, gives noticeable improvement. A larger proportion, say up to 6 per cent, may be added if needed.

BEVERAGES

Sulphuring Fruit Juices

BURNING SULPHUR MATCHES, the oldest method of sulphuring wine or fruit juice, is still practiced, but dissolving an accurately measured quantity of a sulphite in the liquid is safer and more reliable. Potassium pyrosulphite is preferred for this purpose. It gives off half its weight of sulphur dioxide. Errors in the potassium pyrosulphite dosage must be avoided with utmost care, and in particular it must be remembered that, if the salt is exposed to air or allowed to become damp, it gives off sulphur dioxide and so loses its strength.

Sulphur dioxide is effective not only as bactericide but also as a bleaching and reducing agent. In its latter capacity, more particularly as an inhibitor of oxidation, it prevents the darkening of fresh fruit juices which results from exposure to air. Excess sulphur dioxide is objectionable because sensitive persons may suffer headache and other symptoms from drinking wine or juices containing more than a small limiting concentration of free sulphurous acid.

In modern practice, large scale sulphuring is best carried out with cartridges of accurately weighed liquid sulphur dioxide. Under ordinary conditions, a 25-gram cartridge suffices to sulphurize a thousand-liter vat of wine or fruit juice.

Digest from "Sulphuring Wines and Fruit Juices," by E. Vogt, *Nachrichten über Schadlingsbekämpfung* 14, 51, 1939 (Published in Germany).

CANNING & PRESERVING

Copper In Russian Canned Tomatoes

THE COPPER CONTENT of canned tomatoes sometime rises above the permissible limit. Sources of contamination have been studied by determining copper in the tomatoes at various stages in the canning process. A sudden sharp increase in copper content was observed after the cooking operation, when carried out in copper kettles. This can be avoided by steam cooking in wood vessels.

When copper equipment is used in canning, scrupulous cleanliness is helpful to lessening contamination with copper, but is not a preventive. Time is an important factor, since the

amount of copper dissolved is proportional to the time of contact. Domestic canning needs particular attention since the exact methods of factory control are lacking. Comparative analysis of home canned and factory canned tomatoes shows distinctly higher copper content in the home canned products.

Digest from "Accumulation of Copper in Canned Tomatoes at Various Processing Stages," by V. E. Ozetski and V. N. Kefer, *Voprosy Pitaniya* 7, 3, 125, 1938 (Published in Russia).

DAIRY PRODUCTS

Oxidized Flavor in Milk

SOME cows produce milk which is very apt to develop an oxidized flavor when contaminated with traces of copper. The development of this flavor in such milk, artificially contaminated with 1.3 parts per million of copper (as copper sulphate), was greatly reduced by feeding the cows daily either one gram of ascorbic acid (as such or by using a quart of fresh lemon juice) or 350 milligrams of carotene.

The additional ascorbic acid in the ration did not increase the percentage of this acid in the milk, but did seem to increase the carotene content of the milk slightly. Carotene in the ration increased both the carotene (yellow color) and ascorbic acid (vitamin C) in the milk.

Digest from "Oxidized Flavor in Milk. VII. Studies of the Effect of Carotone and Ascorbic Acid in the Feed of the Cow on the Susceptibility of the Milk to Metal-Induced Oxidized Flavor," by W. Carson Brown, A. H. Vanlandingham and Chas. E. Weakly, Jr., *Journal of Dairy Science*, 22, 345, 1939.

Cleaning Farm Cream Separators

SEPARATORS were handled daily by (1) conventional cleaning, thorough washing and steaming, (2) rinsing, followed by continuous immersion in a solution of 5 per cent tri-sodium phosphate and 0.25 per cent sodium chromate, (3) not cleaning. Cream produced in these separators was stored at 60, 70 and 80 deg. F. until it became second grade. Methods 1 and 2 gave about equally good results for keeping quality of the cream, while an uncleaned separator gave cream which went off grade in two or three days sooner at the lower temperatures. The phosphate-chromate solution did not seem to affect stainless steel separator parts in two weeks soaking but did discolor tinned steel parts somewhat.

Digest from "The Influence of Three Methods of Cleaning the Cream Separator and Cream Storage Temperature on the Keeping Quality of Cream," by W. J. Caulfield and W. H. Martin, *Journal of Dairy Science*, 22, 583, 1939.

How to Make Bel Paese Type Cheese

SOFT CHEESE of the Italian Bel Paese type, which can be sliced or spread, can be made in any well equipped cheese factory with a little experience and experiment. Low to medium fat cows' milk, preferably pasteurized, is used. Starter is essential and acidity control very important. Apparatus for pH measurement is advisable in working out a suitable process. The market for this cheese is limited at present, but is slowly expanding. For full details of the process the original circular should be consulted, obtainable for 5 cents from the Superintendent of Documents, Washington, D. C.

Digest from "A Soft Cheese of the Bel Paese Type," by Robert R. Farrar, Circular No. 522, United States Department of Agriculture, April, 1939.

GRAIN PRODUCTS

Wild Rice Composition

SOME FORTY authentic samples of wild rice (the natural seed and the parched seed), grown chiefly in Northern Minnesota, have been analyzed. The literature has been combed, showing that the results of analyses of only eight samples of wild rice have been published, the first in 1862 (one sample) and the latest in 1924 (four samples).

The results of this particular investigation indicate that wild rice seed (hull-free) may vary considerably in composition, as follows: Moisture, 8.8 to 10.1 per cent; fat 0.50 to 1.05; fiber, 0.90 to 1.35; protein, 13.0 to 17.0; sugars, 2.2 to 3.7; pentosans, 1.6 to 2.1; ash, 1.3 to 1.7; calcium, 0.02 to 0.03; magnesium, 0.11 to 0.19; potassium, 0.27 to 0.39; phosphorus, 0.32 to 0.42; sulphur, 0.05 to 0.07; and chlorine, 0.01 to 0.02. The weight per 1000 kernels varies from 27.0 to 35.0 grams and percentage of hulls from 15.6 to 21.0.

Parching — a heat-treatment to which all wild rice is subjected— causes no material change in composition. The parched seed, however, averages somewhat lower in composition than the natural seed. The same applies to the mature seed when compared to the immature.

Several samples of hulls have been analyzed, as well as one sample each of wild rice grown in Wisconsin, Georgia, and Canada. The composition of these three samples of wild rice is comparable to that of the Minnesota samples.

Digest from "The Composition and Food Value of Wild Rice (*Zizania Aquatica L.*)," by J. A. LeClerc, R. G. Capen, and Charles E. Chambliss, United States Department of Agriculture. Presented at American Chemical Society, Boston meeting, Sept. 11–15, 1939.

MEAT PRODUCTS

U. V. Sterilization of Meat Surfaces

AS A METHOD of sterilizing meat, irradiation with ultraviolet light has the advantage of employing no chemical disinfectants. But it also has limitations which necessitate care in using the method and caution in relying on the results. Irregularities in the surface of meat make it impossible to utilize the full germicidal power of ultraviolet light. Only surface effects are obtained since penetration into the meat by the rays is very small. The treatment distinctly lessens germinating power and rate of propagation of bacteria, but if any fat is present it tends to turn rancid. This fat spoilage is caused by ozone, formed from atmospheric oxygen by the ultraviolet light. Similarly, blackening of fresh meat by oxidation when exposed to air is a feature of irradiation with ultraviolet light.

Digest from "Sterilizing Mold Spores on Meat by Means of Ultraviolet Light," by Dumeste, *Revue generale du Froid* 20, 56, 1939 (Published in France).

OILS AND FATS

Oil From Rice Bran

RICE BRAN can be used as a source of oil to be recovered by solvent extraction. Analyses indicate that bran from rice used for Sake averages slightly lower in oil and moisture, slightly higher in protein and starch, and about the same in ash content, as compared with bran from rice used for food. The average oil content (all samples) was 20.38 per cent in bran from horizontal mills, with no large deviation above or below the average.

Horizontal cleaning mills, which tear off the bran, are much better than vertical mills, with their grinding action, insofar as oil content of the bran is concerned. The average oil content of rice bran from a vertical mill was only 15.21 per cent, while the starch content was 24.03 per cent as compared with 13.95 per cent in bran from the horizontal mill.

Oil can also be pressed from rice bran but the yield is lower (14.0 in-

(Turn to page 658)

Formulas for Foods

FORMULA NO. 13

Cast Caramels

60 lb....	Corn sirup
15 "	Standardized invert sugar
40 "	Condensed milk (40 per cent sugar whole or skim)
5 "	Hard coconut butter
6 oz....	Salt
1 5 lb....	Fine granulated sugar
3 0 "	75/25 fondant—boiled to 244 deg.
	Flavor as desired.

Place the corn sirup, the standardized invert sugar, condensed milk, coconut butter and salt into a kettle equipped with double action stirrers. Turn the steam on partly, allow the batch to mix until the coconut butter is melted, add fine granulated sugar, mix well, then turn the steam on full and boil the batch as rapidly as possible to a medium firm ball. Turn off the heat, add the fondant gradually, mixing continuously until the fondant is completely melted. Add the flavor, mix well, then place the batch into the hopper of the depositor and cast into starch.

Note—Have the hopper of the depositor quite hot so as to keep the caramel sufficiently fluid while casting.

This formula was obtained from the Nulomoline Co., New York

FORMULA NO. 14

Tenderlite Marshmallow

Made with gelatin, for filling and topping layer cakes, enrobing cup cakes, and for snowballs to be topped with cocoanut, etc. Semi-cold process.

Small Batch		Large Batch
3½ oz.	Gelatin	2 lb.
6½ "	Water (cold)	4 "
1¼ lb.	Water (hot)	13 "
4 "	Sugar (fine granulated)	40 "
2½ "	Standardized invert sugar	25 "
1½ "	Corn sirup	15 "
As desired	Flavor and color	As desired

Soak the gelatin in the cold water. Heat the soaked gelatin carefully until fluid (about 140 deg. F.).

In the meantime, prepare a sirup by dissolving the sugar in the hot water (heat to 190 deg. F.) and adding to the dissolved sugar the standardized invert sugar and corn sirup. Stir the sirup until the standardized invert sugar and corn sirup are dissolved and then combine these with the fluid gelatin.

Beat the whole mass until of the consistency of marshmallow. Add the flavor and color to the marshmallow just before finishing the beating.

For molasses flavor, use 2½ lb. of open-kettle molasses—highest quality—for each 10 lb. of the total batch and reduce the standardized invert sugar by ½ lb., the sugar by 1½ lb. and the water by ½ lb.

For banana flavor, use about 4 oz. of ripe banana powder containing milk solids for each 10 lb. batch. Incorporate it in any way convenient—preferably first blended with about an equal weight of sugar.

This formula was obtained from the Nulomoline Co., New York, N. Y.

FORMULA NO. 15

Chocolate Flavored Syrup (Double Strength)

Cocoa	23 lb.
Sugar (sucrose)	105 lb.
Water	8 gal.
Sodium benzoate, dissolved in 1 qt. of water	5 oz.

Heat to 218 deg. F. Then add:

(Turn to page 658)

FORMULA NO. 16

Prepared Doughnut Flour

A Dry Blend Flour for
New England Hand-Cut Doughnuts or Crullers

Mix together thoroughly:

	Small Batch	Large Batch
*Fine granulated sugar (sucrose)	11 lb.	110 lb.
Salt (prepared fine)	8 oz.	5 lb.
Nutmeg (fine grind)	3 oz.	2½ lb.
Mace (fine grind)	2 oz.	1 lb. 4 oz.
Salad oil	1 lb. 8 oz.	15 lb.
Powdered turmeric	1/16 oz.	¼ oz.

Add slowly while mixing:

*Flour blend	37 lb.	370 lb.
Dry milk solids (less than 1 per cent fat)	2 lb. 8 oz.	25 lb.
Sodium bicarbonate	6 oz.	3 lb. 12 oz.
Pure cream of tartar	6 oz.	3 lb. 12 oz.
Phosphate	6 oz.	3 lb. 12 oz.
Powdered egg yolk	2 lb.	20 lb.

*Flour blend is most important. A protein of 8.5 to 9.0 per cent has produced a satisfactory doughnut with this blend.

To fabricate: Allow approximately 7 ounces (variable) of water to each 1 lb. of dry blend flour. Cut and handle as usual. Cook at 385 deg. F.

Note: Moisture requirements may be stabilized as flour varies by using 1 to 3 per cent of corn flour or potato flour so that the amount of water the baker uses in the mix will remain constantly uniform. The baker should have the dough as soft as can possibly be handled when rolling and cutting by hand to produce a more tender, fluffy doughnut.

Total leavening may be increased for a more fluffy doughnut.

Formula from Parker-Broeg, Boston, Mass.

The Food Industry News

GENERAL NEWS, BUSINESS TRENDS, MEN, JOBS AND COMPANIES • NOVEMBER, 1939

Food Manufacturers are in Dilemma As January 1 Label Deadline Nears

Food manufacturers will generally be faced with the necessity of putting a complete statement of the ingredients of their products on the labels of goods in interstate commerce after January 1. It appears that an extremely small number of food commodities will come under that part of the new law which Congress intended to give relief from such complete label declaration by fixing of standards of identity.

When January 1 comes there will no longer be any authority for waiver of these label provisions except under one very limited circumstance. The Lea Act which postponed the effective date of the law from June 24, 1939, to January 1, 1940, (with respect to these label requirements) allows further extension only when, in the judgment of the Secretary, expensive labeling or high cost containers should remain in service to prevent excessive waste by early destruction. But such permission can be granted by the Secretary only when the labeling was manufactured prior to February 1, 1939, and then only for use until June 30, 1940.

Aside from the few companies qualified for such exemption there are four other groups of food manufacturers in somewhat differing status with reference to complete label declaration of all the ingredients of their products. These groups include companies which produce:

1. Manufactured foods for which no standards are expected. Complete declaration of ingredients will be required and no exemptions or extensions can be made.

2. Foods for which the fixing of standards of identity has been started but for which no temporary exemption from the label requirements has been granted.

3. Foods for which standards of identity are being formulated with the provision by the Secretary of a temporary exemption from complete label declaration pending completion of the standards. There is a very limited list of goods in this classification, including five kinds of bread, three milk products, canned vegetables and fruits and certain seafoods, cheeses, oleomargarine, mayonnaise dressing, fruit preserves, chocolate products, certain flavoring extracts and a few specialties like sauerkraut and olives.

4. Foods for which standards of identity have been promulgated by the Secretary with effective dates for label declarations for January 1 or later.

Careful students of the food law seem to feel the whole matter has become almost inextricably tangled by delay in standards making. It looks as though the Secretary might find himself compelled to wink at failure to meet the label requirements of the law, or else grant permanent exemption from label declaration of ingredients for certain kinds of foods, a plan which is bitterly opposed by the zealous members of the Food and Drug Administration.

This matter of permanent exemption from label declaration of food ingredients is specifically provided for by Congress in Paragraph 403(*i*)(2). That proviso is "That, to the extent that compliance with the requirements of clause (2) of this paragraph is impracticable, or results in deception or unfair competition, exemptions shall be established by regulations promulgated by the Secretary." Four industries have requested such permanent exemption, but none have received it.

Other important groups of commodities have standards pending. These include canned fruits, canned peas, fruit preserves, jellies and butters and other relatively simple products like milk products, cheeses and so forth. It is evident that it is not going to be possible to promulgate standards soon enough so that manufacturers of any of these foods can complete plans for new label policies by the New Year.

Plenty of trouble appears ahead. Even the most ardent advocates of the new law know that there will be vigorous controversies to celebrate the New Year. But very few expect that the New Year greeting card of the Food and Drug Administration will be any promiscuous threat of seizure of foods not fully labelled in accordance with the details of the new law. Some sort of "reasonable" enforcement for goods having pending standards will be essential.

But the real fight will deal with a more fundamental principle. Some think Congress will take a hand to obtain the type of enforcement intended when the law was passed.

How to Progress through Research Theme of Bakers Meeting in New York

Progress through research was the theme of the convention of American Bakers Association, held in New York, October 15–19. And the full significance of this theme was emphasized by G. Richard Ludlow. Quality Bakers of America, in his talk, "Scientific Shop Control," "Fifteen years ago," he said, "rope was the black plague of the industry, today it is almost unheard of. Fifteen years ago, mold was a recurring summer malady which very few understood and most bakers took for granted. Today, only the careless baker has mold trouble."

The danger of using "false facts" was pointed out by Mr. Ludlow. The false facts are the result of attempting to do experimental and research work or make tests in the shops where accurate control is almost impossible. This work should be done in the laboratory where every factor can be controlled and varied at will until the desired results are obtained.

In furthering scientific control, it would be wise for the bakers to take notice that the graduating class of every good technical school is combed by executives of the better industrial corporations, and the outstanding young men in these classes are immediately given opportunities in those industries, Mr. Ludlow stated.

The importance of continuously determining what the public thinks and wants was discussed by Dr. Claude Robinson, Opinion Research Corp., New York. Such analysis is becoming an important factor in the conduct of many modern businesses.

A new promotion tool for the baking industry was revealed in a talk, "Sales Promotion through Research," by Dr. James A. Tobey, American Institute of Baking, New York. This is a motion picture on bread being made through courtesy of Anheuser-Busch.

Business Prospects Discussed by Packers

Faced with increasing livestock supplies and uncertain market conditions, Institute of American Meat Packers held its annual convention in Chicago, October 20–24. A record registration of about 400 more than last year attended the sessions. The demand for exhibit space was approximately 50 per cent more than available.

W. S. Clithero, Armour & Co., summarized the outlook for the coming year as being good within the next two or three months, but anybody's guess after that. J. S. McLean, Canada Packers, Ltd., confirmed the conclusion that American meat packers can count little on war contracts for market outlets. Much depends, however, upon the length of the war and how it is waged. Supplies on hand and under contract with Canada and European and South American countries have been built up in anticipation of wartime needs. A shortage of feed in Europe may shift the pork demand to the United States.

T. Henry Foster, chairman of IAMP, reported a 5 per cent increase in 1939 meat consumption over 1938. Consumption of lard has gone up to 22 per cent. Mr. Foster looks to further increases in 1940, aside from war orders. Exports for 1939 were up 32 per cent for pork products and 24 per cent for lard, and imports of European pork products have practically ceased since September 1.

An 18 per cent increase in Federally inspected hog slaughter was predicted by C. A. Burmeister, Bureau of Agricultural Economics. Beef slaughter is expected to continue to decrease. The 1939 lamb crop was about 1 per cent smaller than in 1938, but an increase is expected in 1940. The total meat supply for 1940 is expected to be the largest since 1924.

The packers elected Geo. A. Schmidt, Stahl-Meyer, Inc., New York, chairman; Robert Swanston, C. Swanston Sons Co., Sacramento, vice-chairman; Dr. Wesley Hardenbergh, president; H. Harold Meyer, H. H. Meyer Packing Co., Cincinnati, treasurer.

Food Stamp Relief Plan Extended to New Areas

Extension of the food stamp plan, which has met with considerable success since its inauguration in Rochester, N. Y., continues. Within the past few weeks the plan has been put into effect in Springfield, Ill., Allentown and Bethlehem, Pa., Salt Lake County, Utah, and Madison, Wis. Many other cities seek to have the plan applied to their territory, and a rural test in New York has been asked by the State Department of Social Welfare. Organization of the plan on a permanent basis, adapted to contract or expand according to cycles of prosperity and depression, is forseen by Milo Perkins, president of Federal Surplus Commodities Corp.

Secretary Wallace has also extended the stamp purchases of food beyond the retail store. The orange stamps may be used to buy any product handled on bakery or dairy routes and the blue stamps for such surplus commodities as the driver-salesmen may carry. The stamps cannot be used to buy from hucksters or peddlers.

The stamp plan has been applied to the commodities listed as surplus products in Surplus Commodities Bulletin No. 3, approved September 25. This new list includes the following foods: butter, eggs, raisins, apples, pork, lard, dried prunes, onions (except green onions), dry beans, fresh pears, wheat flour and whole wheat (graham flour), and corn meal. Fresh snap beans were designated as surplus from October 1 to October 31.

CONVENTIONS

November

30–Nov. 1—Associated Grocery Manufacturers of America, Waldorf-Astoria Hotel, New York.
30–Nov. 3—American Bottlers of Carbonated Beverages, Palace of Fine Arts, San Francisco.
6–10—American Honey Institute, Sacramento, Calif.
8–16—Sixth Annual Motor Truck Show, Navy Pier, Chicago.
15—Association of Pacific Fisheries, Hotel Del Monte, Del Monte, Calif.
15–17—National Cooperative Milk Producers Federation, Hotel Congress, Chicago.
15–18—1939 Dairy Manufacturers Conference, University of Illinois, Urbana.

December

4– 9—Exposition of Chemical Industries, Grand Central Palace, New York.
5– 6—American Butter Institute, Palmer House, Chicago.
5– 7—Southern Association of Ice Cream Manufacturers, Peabody Hotel, Memphis.
10–12—New England Bakers Association, fall convention, Hotel Statler, Boston.
28–30—Society of American Bacteriologists, Hotel Taft, New Haven, Conn.

Jamaica Requires Licenses

Jamaican defense regulations now require that licenses be obtained for importations of flour, rice, corn meal, wheat, corn, peas, beans, potatoes and condensed milk. Imports of condensed milk and corn meal were restricted earlier this year, as an aid to the establishment of local industries.

War Frees Salmon Market

As a war measure the British Columbia government has decided to cut the province off from a $168,000 salmon dry salt market in Japan, so that the fish will be conserved for Empire use during the conflict. The Government has announced that it will not issue any salmon dry saltery licenses this year.

WORLD'S LARGEST COFFEE PLANT

Night view of the new coffee and tea plant of General Foods Corp., located on the banks of the Hudson at Hoboken, N. J. Open house at the new plant and central research laboratories was held on Friday, Oct. 13. Manufacturing operations started last January. The coffee and tea plant employs 438 people, and 97 more constitute the staff of the central research laboratories. The plant contains 500,000 sq. ft. of floor space (ten acres) and can produce 1,500,000 cups of coffee an hour. The last drop coming from the cup in the electric sign would equal 29,880 cups of coffee.

Failure of Breweries Predicted at Meeting

There is going to be a tremendous failure of breweries within the next two or three years. This was the ominous statement made by F. H. Elwell, public accountant, Madison, Wis., in an address on brewery profits at the convention of the United States Brewers Association in New York, October 2–3. "It is my judgment, after a very careful study of public records of the financial position of Wisconsin breweries since repeal, that not more than 25 have shown profits for each of the last five years," said Mr. Elwell. "If the profit and loss statements of many breweries were analyzed and the truth told as to causes of profitless volume, they might appear as follows (with apologies to Churchill): (1) Profits given away because cost of product was not inclusive and was not accurately known. (2) Profits given away because product was not priced at a profit. (3) Profits given to distributors and retailers to retain their business. (4) Profits given to new distributors and retailers to secure their business. (5) Miscellaneous profit concessions made due to price cowardice."

ELECTED BY BREWERS

G. L. Becker, president of Becker Products Co., Ogden, Utah, was named president of United States Brewers Association at the annual convention in October.

While the volume of beer sold has increased from 37,678,000 bbl. in 1934 to 56,340,000 bbl. in 1938, there has been a decrease of more than 18 per cent in the number of breweries since 1935, the number now being 610. "Many breweries have actually closed, and dozens more have been reorganized and are now operating after being in the hands of a referee in brankruptcy or a creditors' committee," Mr. Elwell said. It is the smaller breweries that are passing out of the picture, and Mr. Elwell expressed the belief that the larger breweries should carry to the smaller ones the gospel of good management and knowledge of costs.

In discussing the break-even point of volume and profit, Mr. Elwell cited an illustration. This example showed that a decrease of 6⅔ per cent in selling price (from $15 to $14 a bbl.) would decrease profits 50 per cent and would necessitate a 24 per cent increase in volume to yield the same total profits as under the $15 price.

Representative Bruce Barton spoke to the brewers on advertising. He made a point to the effect that advertising ought to be always a little better than the company doing it. Then the company should come up to the advertising.

Master Brewers Learn About New Developments

How the latest scientific developments in the control of raw materials, pretreatment, packaging and sterilization are affecting the brewing industry was brought out in papers before the convention of Master Brewers' Association in San Francisco, October 15–19. Dr. J. W. McBain, Stanford University, described a number of modern tools which are capable of giving essential information both as regards beer itself and its foam. These included ultra-filtration, a new simple ultra-centrifuge developed at Stanford and the Blodgett and Langmuir technics for studying surface films. None of these has been adequately exploited in the study of beer; when, they are, he declared, much new knowledge may be expected.

In discussing vitamins and related substances in yeast, Dr. M. A. Joslyn, University of California, reported on exhaustive qualitative and quantitative tests which emphasized the fact that different yeasts exhibit decidedly different capacities for the elaboration of vitamins and that these capacities may be attained or repressed by manipulation. He stated that yeast offers the best opportunity for studying the conditions relating to the formation of vitamins.

A new technic for observing and testing the modification of albumens in the brewing process was revealed by Benno Lowy, Pacific Chemical Laboratories, San Francisco. In place of the time-honored observation of the hot break in the kettle, Mr. Lowy substitutes a micro-technical method for studying the formation and behavior of amino acids. The method employs a microscope, a source of polarized light and a Contax camera. Typical crystallizations of definite characteristics were developed in the laboratory which could be related to albumen modification in the brewing process.

Canning in relationship to beer was discussed by O. W. Lang, University of California. Strict observation of closure, strict cleanliness of the container and occasional inspection of the internal linings are essential, he declared. Plant and laboratory control in the selection of raw materials, pretreatment, packaging and sterilization are the measures which insure a satisfactory product in his opinion.

HEADS UBIF

Carl W. Badenhausen, president of P. Ballantine & Sons, Newark, N. J., was elected chairman of the United Brewers Industrial Foundation at the meeting in New York on Oct. 4.

George B. Sipple, Burger Brewing Co., Cincinnati, was elected president of MBA.

Brewers Hear Results Of Clean-up Campaign

How the brewing industry is cooperating with law enforcement officials in eight states to revoke licenses of retail outlets operating in a manner prejudicial to beer's good name was discussed at the meeting of United Brewers Industrial Foundation, in New York, last month. More than 3,000 retail outlets have been investigated in the few months that the campaign has been in operation in Nebraska, Alabama, Kansas, Tennessee, North Carolina, Mississippi, Oklahoma and West Virginia. As a result of these investigations, license revocations, suspensions or injunctions were imposed by state and local authorities against more than 120 law violating establishments. Many other outlets heeded the industry's warning and corrected objectionable practices.

Following the convention, nearly a thousand members of the brewing and allied industries took part in the Brewing Industry Day at the New York World's Fair. Addressing a group of the brewers on this occasion, Dr. George H. Gallup, American Institute of Public Opinion, said that after six

years of repeal, the American people are still overwhelmingly opposed to any return of Prohibition. However, the surveys of the Institute show that dry sentiment has been gradually growing since the advent of repeal. The increase has been at the rate of approximately 1 per cent a year for the last six years, the chief gain coming in the farm and small-town areas.

Dairy Industries Meet

More than 1,200 attended the annual convention of International Association of Ice Cream Manufacturers in San Francisco, October 23–25. This meeting opened concurrently with the Dairy Industries Exposition and was followed by the convention of International Association of Milk Dealers. An interesting development reported at the meeting was a research experiment that will enable ice cream manufacturers to utilize 28 types of frozen fresh fruits for flavoring at all times of the year. The University of California and Utah State Agricultural College cooperated with the Department of Agriculture in this research.

Officers reelected for 1940 were: president, W. J. Barritt, Tampa; vice-president, L. E. Hurtz, Omaha; treasurer, Claude Parcel, Fredericksburg, Va.; executive secretary, Robert C. Hibben, Washington, D. C.

Arguments Continue About Food Standards

Debate on the various aspects of food standards under the Food, Drug and Cosmetic Act continued last month between representatives of the industries and the government. At the hearings on preserves and on jellies, the testimony was practically the same, with representatives of industry strenuously objecting to the requirement for label declaration of pectin, acid and buffer salts and urging that the minimum amount of juice in jelly mixtures be set at 15 per cent. The government pressed its contention that all optional ingredients should be declared on the label, and that the minimum amount of juice in mixtures of two juices ought to be 40 per cent.

At the hearings on cheese there was a controversy as to whether the word "cheese" should be designated as the usual word for American cheddar cheese. The government took the attitude that it should, while industry spokesmen tried to keep the word "cheese" free and insure the use of a qualifying word in naming a particular type of cheese. At the hearing on cream cheese, the outstanding features were vigorous support by large manufacturers of the government's proposal for a high-fat, low-moisture cream cheese and the openly expressed fear by smaller manufacturers that they would be "legislated out of existence" by such a standard. Another point of argument was whether propionates should be exempted from label declaration when added to cream cheese, industry chemists testifying that they should.

Standards Meeting Nov. 8

Final meeting of the Food Standards Committee for this year has been set at Washington, November 9. The committee at that meeting is to consider the basis for proposed standards for ice cream, grape juice, orange juice, concentrated orange juice, grape fruit juice, macaroni and noodles. Except for the discussion on ice cream, the meetings will be closed. Data for consideration by the committee may be submitted in writing to the Secretary of the Food Standards Committee, or the Secretary may be asked for a specific appointment for the hearing.

Wages and Hours Change

Minimum wages increased and maximum hours decreased under the Social Security Act on October 24. On this date became effective the prescheduled increase in minimum wages to 30 cents per hour and decrease in hours to 42 per week. Employees working in excess of 42 hours per week must be compensated at the rate of 1½ times the regular hourly rate.

Britain Requisitions Lard

The Food Ministry of the United Kingdom has issued an order for the requisitioning of all future imports of refined lard arriving in the United Kingdom from all sources except Erie. In addition, the order restricts dealing in refined lard outside the United Kingdom, for the purpose of importation, only to holders of licenses issued by the Food Ministry.

CAPITAL VIEWS

PROCESSING TAX—The belief grows in Washington that farm relief next year will have to get along with less money than last. The peak of the honeymoon of New Deal and agriculture is passing. But money distribution in election year cannot be cut too sharply. Hence the plan for renewal of processing taxes under the income certificate program. This is not very different from the old tax in an odd-style suit of clothes.

PRICE CONTROLS—Washington must find some way to keep price rises under control, for any such are politically dangerous execept, of course, the rise in price of farm products, which is politically favorable. There will be continuance of the effort to talk prices down, by argument and threats of official action. Legal attacks on profiteers will also be both talked and tried. But in the last analysis, taxing surplus profits away from those who make them seems the most certain technic. Unfortunately the food industries are most prominent among those talked at, and about.

ANTITRUST SUIT LOST—Justice Department officials expect to appeal or start new action against ice cream makers under antitrust laws. They are satisfied that attempted control of local outlets through restraint on the counter-freezers and mechanical devices will not be approved by the courts if they can ever get this particular point up for judicial finding. Most of the defeats suffered by the Department thus far have been on technicalities, not on the issue of whether or not restraint of trade is taking place.

WAR-TIME CONTROLS—Repeatedly, Washington finds evidence that every New Deal force is working on the President to insist that all war-time controls be lodged with New Deal agencies. The Stettinius board was "discharged with thanks" because of this influence. The food industries, according to the "Planers", would be managed by the Department of Agriculture or by AAA in the event of military emergency. Incidentally, the Attorney General told Congress that he could not report on what emergency powers the President now has because they were too numerous, and precedent forbade his attempting to tell Congress what its own laws meant.

STANDARDS PLANS—By announcing the subjects which the Food Standards Committee will consider beginning Nov. 8, the Food and Drug Administration virtually declares the type of commodities which will next have attention in its program of definitions and standards of identity. These products are: ice cream, grape juice, orange juice, concentrated orange juice, grapefruit juice, macaroni and noodles. It is a fair guess that only ice cream will have any formal proceedings started before the New Year.

Action on Food Standards

Examiners findings on standards of identity were published in the *Federal Register* on the following dates.

Canned apricots	Oct. 5
Canned pears	Sept. 19
Canned cherries	Oct. 11
Cream and whipping cream	Sept. 26

Findings relative to fill of container and quality of canned apricots, cherries and pears were published on October 24.

An order in regard to amendment to coal tar regulations promulgated by order of May 9 (Docket 4) was published in the *Federal Register* of September 16, effective on that date.

Dates of all previous actions of food standards were published in the October issue of FOOD INDUSTRIES, page 569.

Lay Laboratory Cornerstone

In the presence of about 500 leaders in agriculture, government and industry, the cornerstone for the Northern Regional Laboratory of the Department of Agriculture was laid at Peoria, Ill., on October 18. Secretary Wallace, officiating at the significant ceremony, emphasized the importance of the pilot-plant aspect of these laboratories as a means of speeding the adaptation of research findings to commercial industrial practice.

The particular problems to be tackled at the Northern Regional Laboratory at Peoria have to do with corn, wheat and agricultural waste products such as corn stalks, straw, cobs and hulls. This and the other three regional laboratories, to be located at New Orleans, Philadelphia and San Francisco, are also possible centers of research for national defense.

Packaging Institute Meets

More than 100 representatives of the packaging industry met in Chicago, October 19–20, at the convention of Packaging Institute. At the meeting, Arthur B. Erekson, Borden Co., discussed the new transparent packaging materials for cheese and fresh fruits. J. L. Clark, Department of Agriculture, told the industry that truthful labeling and proper fill of containers were advisable under the new food law. Allan H. Mogensen, consultant, made a visual presentation of what can be done in time and motion economy by stimulating packaging machine operators to take more interest in their work. The officers of the Institute were re-elected, Wm. M. Bristol, Bristol-Meyers, Co., being president.

New Jersey Food Law Aligned with Federal

Listing of ingredients on food labels will be required in intrastate commerce in New Jersey after Jan. 1, according to amendments to the state food law.

Sections on adulteration and misbranding have been amended so that they conform in most respects to the Federal food act. Added to the New Jersey section on general food adulterations is the paragraph that food shall be deemed adulterated "if it falls below the standard of purity, quality or strength which it purports or is represented to possess." The exemption as to citrus fruit coloring is omitted, while confectionery may contain harmless vegetable coloring as well as certified coal-tar colors.

As to food misbrandings, New Jersey has extended an exemption from ingredient listing to carbonated beverages if the ingredients have been, by affidavit, fully and correctly disclosed to the State Department of Health.

Construction News

	Pending (thousands)	Awarded October (thousands)	Total Awarded 1939 (thousands)
Bakery	$50	$710	$3,644
Beverages	565	469	5,357
Canning and Preserving	85	.....	200
Confectionery	45	50	125
Grain Mill Products	405	.....	3,235
Ice Manufactured	92	.....	395
Meats and Meat Products	90	204	931
Milk Products	400	345	1,581
Miscellaneous	780	312	3,128
	$2,512	$2,090	$18,596

Other differences from the corresponding Federal section on misbranding are the omission of the net weight requirement and the omission of the label declaration in regard to foods falling below a prescribed standard of fill of container.

New Jersey is the eighth state to bring its food law into some conformity with the Federal act. Most of these state food laws will become effective Jan. 1, 1940, the effective date of the Federal food law.

Seek Salad Oil Exemption

Salad oil interests are asking ingredient listing exemption and a standards hearing on their product. Their interests have filed a petition with Secretary Wallace, urging him to call a standards hearing, and to place salad oils on the list of foods exempted from the requirement of disclosing their ingredients on the labels pending such time as the hearing can be held and standards promulgated.

More Meat in Prospect

With supplies of livestock for slaughter now at the highest point in the past six years, the United States Department of Agriculture expects supplies to continue to increase, at least for another year. This forecast is made in a recently released survey, which also states that slaughter of hogs and cattle in the winter of 1939–1940 is expected to increase and may cause some falling off in meat prices.

The same report forecasts a total of 83,000,000 hogs on farms this fall, the largest number since 1933.

Candy Sales Move Up

Even before the business lift that followed the start of war on Sept. 1, sales of confectionery and competitive chocolate products were showing distinct improvement. Sales of the 223 manufacturers reporting to the Bureau of the Census amounted to $15,611,000 in August, 1939. This was an increase of 10.5 per cent above the sales of $14,129,000 recorded in August, 1938, and was 36.4 per cent above the sales of $11,448,000 for July of this year.

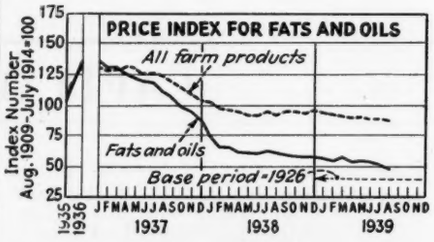
For the first eight months of 1939, sales of these products were up 2.3 per cent over sales for the same months of 1938. In this time, chocolate manufacturers increased their sales 4.0 per cent, while the increase of other candy manufacturers was 2.2 per cent.

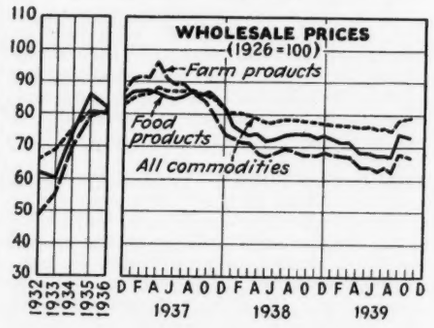
Food Prices Hold Steady

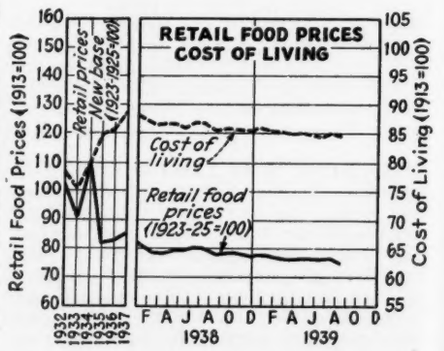
With time to appraise better the possible results of war in Europe, food commodity prices steadied in late September. From then on, until mid-October, prices of important food raw materials were not far from those of a year before. The price index (*N. Y. Journal of Commerce*) for grains, on Oct. 14 stood at 63.1, compared to a figure of 63.7 a year before, while the index for foods was 70.8, compared to 68.6 in 1938.

Such a price situation is entirely rational, in view of the negligible increase in purchases of American foods for export and the large supplies of most food raw materials available in the country. Food exports stepped up somewhat during the summer and levels established then have been maintained. As a result, certain prices are higher than the summer lows, but the resulting level is about that of normal seasonal expectation.

Among the individual commodities,







wheat, No. 2 dark winter was 80¼c. on Oct. 14, compared to 85½c. on Sept. 14; flour, spring patents, $5.60 compared to $5.85; corn, No. 3 yellow, 48½c. compared to 60⅜c.; beef, steers, 14½c. compared to 17c.; pork loins, 18½c. compared to 22c.; lard, $7.15 compared to $8.20; eggs, 19c. compared to 19½c.; butter, 29¼c. compared to 28c.; cheese, 17¼c. compared to 16¼c.; sugar $3.60 compared to $3.70; coffee, 7⅝c. compared to 7½c.; cocoa, Accra, $5.45 compared to $6.35; cottonseed oil, 5¾c. compared to 6⅛c.; tomatoes, canned, No. 2 Maryland, 61½c. compared to 65c.; peaches, canned, standard and salmon, No. 1 red, tall, both unchanged.

Cherry Pack At Record

Pack of sour red pitted cherries in 1939 broke all records, surpassing the previous record year of 1935 by about 20 per cent. According to statistics released by the National Canners Association, the pack this year totaled 3,137,545 cases, compared to 1,694,813 cases in 1938 and 2,471,982 cases in 1937. The previous record, in 1935, was 2,562,682 cases. Oct. 1 stocks, sold and unsold, of sour red pitted cherries totaled 1,147,180 cases, while 2,088,078 cases were shipped in July, August and September.

Data for the Charts

In preparing the curves shown on this and the preceding page of FOOD INDUSTRIES, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* fats and oils index, Bureau of Raw Materials for American Vegetable Oils and Fats Industries.

INDICATORS

FLOUR OUTPUT in September, 1939, as reported by *The Northwestern Miller* for mills representing 64 per cent of U. S. output, was 7,330,043 bbl., compared to 6,092,055 bbl. in August, 1939, and 6,349,943 bbl. in September, 1938.

CABBAGE for sauerkraut is expected to total 105,200 tons in 1939, compared to 195,400 tons in 1938 and a ten-year average of 153,800 tons.

BEET PRODUCTION for canning in 1939 is now estimated at 36.700 tons, compared to 71,880 tons last year and a 1929–1937 average of 40,600 tons.

TOMATOES for manufacture in 1939, according to the latest report of the Agricultural Marketing Service, will total 1,747,300 tons, compared to 1,737,700 tons in 1938.

LIMA BEANS for manufacture in 1939, as reported by the Agricultural Marketing Service, will be 28,960 tons. Last year's production was 28,740 tons.

SALMON, canned, in packers hands in mid-September was only 2,644,417 cases compared to 3,898,219 cases a year before. Since July 1, 1939, more than 3,500,000 cases have been sold.

FISHERY PRODUCTS in frozen storage on Aug. 15, 1939, totaled 72,770,000 lb., 4 per cent lower than the figure for the date in 1938, but 7 per cent above the five year average.

BUTTER, creamery, produced in August, 1939, totaled 164,960,000 lb., compared to 167,075,000 lb. in August, 1938, and a 1930–1937 August average of 150,925,000 lb.

CHEESE PRODUCTION in August, 1939, was 52,420,000 lb., 4 per cent lower than August, 1938, but up 25 per cent over the 1930–1937 August average.

EVAPORATED and condensed milk produced in August, 1939, totaled 196,623,000 lb.

OLEOMARGARINE SALES in August, 1939, as indicated by sales of internal revenue stamps, totaled 22,867,124 lb.

FRUITS, frozen, in storage on Oct. 1, 1939, totaled 141,710,000 lb. compared to 147,581,000 lb. on Oct. 1, 1938, and a 1934–1938 average of 103,213,000 lb. for the date.

VEGETABLES, frozen, in storage on Oct. 1, 1939, amounted to 78,122,000 lb., against 71,252,000 lb. a year before.

BUTTER, creamery, in storage on Oct. 1, 1939, was 154,571,000 lb., compared to 210,703,000 lb. on Oct. 1, 1938, and a 1934–1938 Oct. 1 average of 142,421,000 lb.

CHEESE, all kinds, in storage on Oct. 1, 1939, totaled 116,618,000 lb., against 140,755,000 lb. a year before and a 1934–1938 average of 123,134,000 lb. for the date.

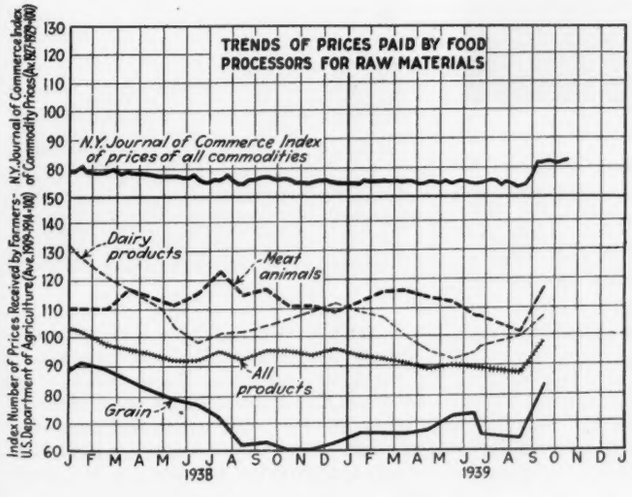
EGGS, case equivalent, in storage on Oct. 1, 1939, totaled 8,900,000 cases. On Oct. 1, 1938, the figure was 7,915,000 cases, and the 1934–1938 average for the date was 9,323,000 cases.

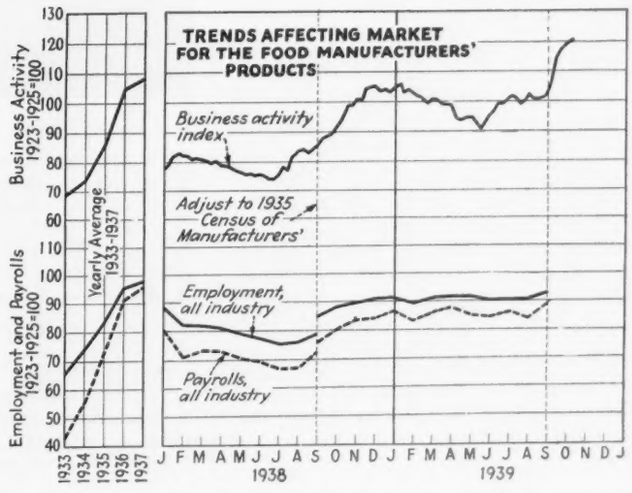
POULTRY, all kinds, in frozen storage on October 1, 1939, amounted to 63,151,000 lb., compared to 59,942,000 lb. a year before and a 1934–1938 Oct. 1 average of 59,748,000 lb.

MEAT, all kinds, in cure and frozen storage on Oct. 1, 1939, was 399,935,000 lb. The figure a year before was 369,266,000 lb. and the 1934–1938 average was 471,950,000 lb. for the date.

LARD IN STORAGE on Oct. 1 this year totaled 78,472,000 lb. The figure on Oct. 1, 1938, was 89,946,000 lb. and the 1934–1938 average for the date was 87,552,000 lb.

WEEKLY FOOD INDEX of Dun & Bradstreet stood at $2.39 on Oct. 10, the lowest figure since Sept. 5. For the same date in 1938, this index was $2.42.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Dairy products
Meat animals
All products
Grain
Index Number of Prices Received by Farmers-U.S. Department of Agriculture (Ave. 1909-1914=100)
N.Y. Journal of Commerce Index of Commodity Prices (Ave. 1927-1929=100)
J F M A M J J A S O N D J F M A M J J A S O N D J
1938
1939


Business Activity 1923-1925=100
Employment and Payrolls 1923-1925=100
Yearly Average 1933-1937
1933 1934 1935 1936 1937
TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Business activity index
Adjust to 1935 Census of Manufacturers'
Employment, all industry
Payrolls, all industry
J F M A M J J A S O N D J F M A M J J A S O N D J
1938
1939

Men, Jobs & Companies

INDUSTRY

Canada Dry Bottling Co. of Florida, Inc., is offering 67,995 shares of common stock, $5 par value per share, the proceeds of which will be used for purchasing machinery, for new plant construction and for franchise payment.

Canada Dry Ginger Ale, Inc., recently purchased the old Hupfel Brewery property in New York for $500,000.

Coca-Cola Co. recently filed suit in the chancery court of Delaware, at Wilmington, to restrain Nehi Corp., makers of Royal Crown Cola, from using the word "cola".

Coopersville (Mich.) Packing Co. has taken over the Daggett Canning Co. plant at Coopersville and will remodel it and install new machinery. The plant has been closed for some years.

Foremost Dairies, Inc., has acquired the wholesale ice cream business of Seminole Creamery Co., Sanford, Fla.

Geo. A. Hormel & Co., Austin, Minn., has started construction of a $125,000 factory building in East St. Louis, Ill. The new plant will manufacture Spam.

Kroger Grocery & Baking Co. will erect a $500,000 factory adjacent to its present plant headquarters in Cincinnati. The new factory will have 163,000 sq.ft. of floor space. The company recently opened a $100,000 peanut shelling plant at Oglethorpe, Ga.

Kurschner Baking Co., Forest Hills, N. Y., has transferred all production operations to a new plant in Glendale, N. Y.

Loft, Inc., Long Island City, N. Y., plans a reorganization which will separate the candy business from its holdings in Pepsi-Cola Co.

National Biscuit Co., New York, has let the contract for the erection of a $3,200,000 bakery in Atlanta, Ga. The plant will be of advanced design, laid out for straight-line production, with long multiple-unit traveling ovens. It will be a "daylight" bakery, one story high, 1,200 ft. long, and will have practically no windows. Skylights will provide lighting, and air conditioning will take the place of natural ventilation. There will be 400,000 sq.ft. of floor space in the factory.

EDWIN T. GIBSON

General Foods Corp., New York, has elected him a vice-president. For the past six years he has been in charge of the Birds Eye frosted foods business of the company.

VERNON D. BEATTY

From assistant advertising manager, he moves up to advertising manager for Swift & Co., Chicago, taking the place of Leo Nejelski, who has gone with Pepsodent Co. C. H. Wolfe, head of sales promotion for Swift, becomes assistant advertising manager.

Pepsi-Cola Co., Long Island City, N. Y., has approved plans for a 170-ft. extension to its bottling department. The company intends to step up production to more than 100,000 cases a day.

Rocky Mountain Packing Corp., Ogden, Utah, has rebuilt its freezing plant to increase the capacity for fruits and vegetables.

Scala Packing Co., Utica, N. Y., will spend $75,000 on alterations and improvements in its plant.

Streitmann Biscuit Co. has formally opened its new branch plant at Columbia, S. C. The new plant is the eighth distributing center to be established in West Virginia, Virginia and North and South Carolina.

Weston Biscuit Co. has purchased the interests of the bankrupt Associated Biscuit Co. at Salamanca, N. Y. This plant will serve as a link between the factories in Battle Creek, Mich., and Passaic, N. J.

PERSONNEL

Ed Auge, president of Auge Packing Co., San Antonio, Tex., heads up the newly formed Texas Meat Packers Association.

Robert Beutler, former manager and part owner of Fountain City Dairy Co., Fond du Lac, Wis., has purchased Summit Dairy, Iron Mountain, Mich.

M. J. Blish, formerly head of the Department of Agricultural Chemistry, University of Nebraska, and professor and chairman of the Department of Chemistry, Nebraska Agricultural Experiment Station, Lincoln, has been made chief of the protein division of the Western Regional Research Laboratory at Albany, Calif.

M. T. Bowyer succeeds W. G. Tidwell as manager of the Greensboro (N. C.) plant of Carolina Baking Co. Mr. Tidwell has been moved to Miami as manager.

Mary M. Brooke, formerly research chemist for Omar Baking Co., Omaha, and prior to that chief chemist for Purity Bakeries Corp., Chicago, will open, about Nov. 1, a high-quality retail bake shop in the Country Club Plaza district of Kansas City, Mo.

Harry C. Carr, vice-president and a director of Libby, McNeill and Libby, Chicago, has retired on pension after 46 years in the meat packing and food canning industries. Scott A. Holman, vice-president of the company, has been elected a director to succeed Mr. Carr.

Edward E. Willkie was made a vice-president.

O. A. Church has been elected president of Noblesville (Ind.) Milling Co. to succeed Walter C. Marmon, who continues as a director. Don B. Jenkins was made secretary and treasurer.

George W. Eddington, formerly superintendent of the De Mets, Inc., candy plant in Chicago, is now with Howe Candy Co., Hamilton, Ont.

Clarence E. Eldridge, Ray M. Schmitz, James Ingram, 3d, and Mrs. E. B Meyers have been named vice-presidents of General Foods Sales Co., Inc., New York. Each of the new officers is in charge of the merchandising of a group of the company's products.

O. B. Fleming is now manager of the Swanton (Ohio) Milling Co.

W. H. T. Foster retires Nov. 1 as vice-president of John Morrell & Co. and general manager of its Sioux Falls, S. D., plant, after 46 years of service. He will be succeeded by J. M. Foster, his brother and formerly assistant manager of the plant.

Earle J. Freeman has been elected vice-president in charge of domestic sales for Kellogg Co., Battle Creek, Mich. Mr. Freeman has been with the company 25 years and is a director.

Kurtis R. Froedtert returns to active management of Froedtert Grain & Malting Co. Inc., Milwaukee, as chairman and president. He had relinquished the office of president in 1937.

J. WILLARD PIPES

He has been elected vice-president of Pepsi-Cola Co., Long Island City, N. Y. Mr. Pipes heads up the company's standarization department, which supervises standardization work among more than 450 franchise bottlers in the United States.

William J. Lemp, member of the Lemp brewery family of St. Louis, has acquired, with several associates, a substantial interest in Central Breweries, Inc., E. St. Louis. The name of the acquired company will be changed to William J. Lemp Brewing Co.

Dr. Howard D. Lightbody has been appointed principal biochemist to head the division of biochemistry in the Western Regional Research Laboratory, Albany, Calif. Since 1931, Dr. Lightbody has been with the Food and Drug Administration.

John A. Logan, Washington, D. C., was re-elected president of National Association of Food Chains, Oct. 11, at the convention in Chicago.

P. M. McCarrell becomes manager of Quaker Oats Co.'s division in Saskatoon, Sask., succeeding W. H. White, who has been transferred to London.

Fred H. Massmann has resigned as president of National Tea Co., Chicago, and has taken a position as general sales manager of Peter Fox Brewing Co., Chicago. Mr. Massmann had been associated with National Tea Co. since 1914.

T. M. Rector, from the New York office of General Foods Corp., is manager of the company's new central research laboratories in Hoboken, N. J. J. Ornfelt, from the eastern development laboratory, Hoboken, is in charge of the food technology laboratory; G. A. Fitzgerald, from the frosted foods laboratory in Boston, in charge of biochemistry and micro-chemistry; L. Elder, Battle Creek, in charge of the division of physical chemistry; M. S. Fine, Battle Creek, director of chemical research; N. E. Berry, St. Clair, director of engineering research; R. E. Kremers, Battle Creek, in charge of the organic chemistry division; A. K. Olsen, Battle Creek; in charge of the colloid chemistry division; H. W. Putnam, Evansville, chemist in charge of manufacturers' service department. More than 30 other technical men were moved to the new laboratories from other locations.

Arthur Unger retired Oct. 1 as vice-president of General Foods Sales Co., New York. Engaged in sales and promotion of grocery specialties for more than 35 years, Mr. Unger became vice-president and national sales manager in 1935 and in 1938 was placed in charge of trade relations.

M. E. Wangeheim, Jr., son of the president of California Conserving Co., San Francisco, has been placed in charge of the company's plant at Hayward, Calif.

J. J. Willaman will be chief of the division of biochemistry of the Eastern Regional Laboratory of the Department of Agriculture, Philadelphia, effective about Dec. 1. For the past nine years he has been in charge of biochemical research at Rohm & Haas Co. Bristol, Pa.

DEATHS

James Phinney Baxter, Jr., 72, for 50 years a member of H. C. Baxter & Bro., Brunswick, Me., Sept. 25.

Adolf Bremer, 70, president of Jacob Schmidt Brewing Co., St. Paul, Oct. 9, in Seattle, Wash. Mr. Bremer was the father of Edward G. Bremer, banker, who was kidnapped and held for $200,000 ransom in 1932.

Robert C. Clark, 75, vice-president of Pabst Brewing Co., Oct. 4, at Peoria, Ill.

Frederic H. Frazier, 66, chairman of the board of General Baking Co., New York, for fourteen years, until his retirement last January, Oct. 9. Mr. Frazier was associated with the baking industry for 35 years.

Fritz Goebel, 63, president, general manager and brewmaster of Banner Brewing Co., Saginaw, Mich., Sept. 20.

Chris Hochgreve, 62, president and treasurer of the Hochgreve Brewing Co., Sept. 12, in Allouez, Wis.

G. C. Papendick, Sr., 55, president of Papendick Bakery Co. and of Papendick, Inc., bakery equipment firm, Sept. 28, at St. Louis.

Cloid H. Smith, 75, president of American Popcorn Co., Sioux City, Iowa, which he founded in 1914, Oct. 12.

William Wrigley, 3d, 50, nephew of William Wrigley, Jr., founder of the chewing gun concern, Sept. 14. He retired from the Wrigley Co. in 1933.

ASSOCIATED INDUSTRIES

Anchor Hocking Glass Corp., Lancaster, Ohio, has promoted C. D. King to director and general manager of the container division.

Carrier Corp., Syracuse, N. Y., has reopened a branch office in Washington, D. C., in charge of Herbert Peacock.

Dodge Manufacturing Corp., Mishawaka, Ind., has elected Joseph E. Otis, Jr., as president to succeed the late George C. Miller. He formerly was head of Stewart-Warner Corp., Chicago.

Graton & Knight, Worcester, Mass., has added George L. Abbott to the organization, as director, vice-president and general sales manager.

Fruehauf Trailer Co., Detroit, has appointed E. W. Stock director of service.

Toledo Scale Co. has started operations in its new factory, which replaces the six old plants in Toledo.

Just off the Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

COOLERS—Stainless steel milk and beverage coolers featuring controlled flow refrigeration are discussed in Bulletin 89 by Mojonnier Bros. Co., 4601 W. Ohio St., Chicago, Ill.

REFRACTOMETER—"Precision Requirements in Refractometer Design", paper by J. W. Forrest, Bausch & Lomb Optical Co., Rochester, N. Y., has been reprinted from Proceedings, International Society Sugar Cane Technologists, Sixth Congress, Baton Rouge, La., 1938.

REFRIGERATING EQUIPMENT—Air conditioning, refrigerating and ice-making equipment are described in Bulletin No. 196-E; and "Instant" water coolers, in Bulletin 153-F by Frick Co., Waynesboro, Pa.

SEPARATORS—Bulletin No. 93-A covering spout separators and magnetic drums for flour, cereals, cotton seed, and other pulverized materials has recently been issued by Sterns Magnetic Mfg. Co., Milwaukee, Wis.

WATER CONDITIONING EQUIPMENT—The Permutit Co., 330 W. 42d St., New York, N. Y., presents the automatic de-sludging valve for hot lime soda softeners, the deflector plate distributor and equipment designed for preparing water for ice-making, in three new bulletins.

Plant Accessories and Supplies

AIR ELIMINATORS—The automatic air eliminator for high pressure steam apparatus is presented in Bulletin No. 108 by Gorton Heating Corp., Cranford, N. J.

BALL BEARINGS—"Sealmaster" pillow blocks, flange and take-up ball bearing units are discussed in 8-page illustrated Catalog 739 by Stephens-Adamson Mfg. Co., Aurora, Ill.

BELTS — "Belting Biographies", issued by Mechanical Goods Division, United States Rubber Co., 1790 Broadway, N. Y., covers a complete line of transmission and conveyor belts with illustrations of typical installations.

CHAINS AND SPROCKETS—Silent chain drives for power transmission and sprockets for use with these chains are illustrated and described in detail by The Whitney Chain & Mfg. Co., Hartford, Conn., in a recent 64-page bulletin.

CLUTCHES—The Carlyle Johnson Machine Co., Manchester, Conn., has published a 1939 clutch catalog describing standard type friction clutches, complete with specifications and price lists.

COUPLINGS—Twelve features of "Morse" flexible couplings are listed in 32-page illustrated Bulletin 57 by Morse Chain Co., Ithaca, N. Y.

POWER EQUIPMENT—Worthington Pump & Machinery Corp., Harrison, N. J., have published the following: Bulletin W-210-B24 on deaerating heaters and deaerators, vertical double-element type; Bulletin S-500-B37 on evaporative coolers for engine jacket water; Bulletin C-1100-B5 on refrigeration compressors, vertical duplex double-acting with enclosed crank case, Type VDA; Bulletin C-1100-B3 on combined unit air conditioner; and Bulletin C-1150-B2 on air conditioning installations around the world.

ELECTRIC MOTORS—General Electric Co., Schenectady, N. Y., has issued the following publications: GEA-137D on "Low-Speed Synchronous Motors, Type TS"; and GEA-1960A on "Low-Speed Synchronous Generators, Types ATB and ATI".

PIPE MACHINES—Catalog No. 39-A, devoted to pipe and bolt threading equipment, lists three new machines: No. 562 "Tom Thumb" portable pipe machine, No. 531 "Tom Thumb" bolt machine and No. 422 power vise stand, products of The Oster Manufacturing Co., 2057 E. 61st Place Cleveland, Ohio.

POWER TRANSMISSION—Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill., has issued the following bulletins: 272-page Book No. 1600 containing list prices, application data, specifications and designs for power transmission units; and 1278-page General Catalog No. 800 with full details on equipment for handling, screening, drying, cooling and preparing materials mechanically, complete with a 44-page pictorial section.

PUMPS—Bulletin D-48 of Lawrence Pump & Engine Co., P. O. Box 70, Lawrence, Mass., contains information on Type "HBD" vortex centrifugal pumps, single stage and single suction, designed for general industrial services.

SPEED REDUCERS—Stephens-Adamson Mfg. Co., Aurora, Ill., has published 8-page illustrated Catalog No. 7838 on "Saco" speed reducers, available in four sizes with output speeds from 14 to 176 r.p.m.

SPEED CONTROLS—Columbia Vari-Speed Co., Liberty Bldg., Wheaton, Ill., offers the new JFS-Jr. vari-speed controls in a recent bulletin, complete with selection tables, dimensions and operation data.

STEEL FITTINGS—Alloy Products Corp., 221-241 Madison St., Waukesha, Wis., features stainless steel sanitary fittings for the dairy industry, in a recent illustrated catalog.

VACUUM MACHINE — Model 55 vacuum machine for industrial plant, floor maintenance is announced in a recent folder by Hild Floor Machine Co., 1313 W. Randolph St., Chicago, Ill.

WATER HAMMER—Water Hammer Arrestor Corp., Milwaukee, Wis., has issued an 8-page illustrated catalog on "Wacor" water hammer arresters, available in six sizes, for the elimina-

tion of destructive water hammer pressure.

WATER COOLER — Carrier Corp., Syracuse, N. Y., announces a new, bronze water cooler, 15½ in. sq., in Bulletin CR-126.

WIRE FABRICS—Multi-Metal Wire Cloth Co., 1350 Garrison Ave., New York, N. Y., has issued a 48-page illustrated catalog containing information on wire and filter cloths, fabrication and technical data.

ZINC PAINT—"Improved Maintenance of Metal Surfaces with Zinc Dust Paints for Industry" is the title of a recent publication of The New Jersey Zinc Co., 160 Front St., New York, N. Y.

Packaging

COLLAPSIBLE TUBES — Stand-Up Tube Cap Corp., 54 W. 21st St., New York, N. Y., introduces "Pedestal Cap", a collapsible tube with a stand-up base designed for semi-liquid products, in a new bulletin.

LABELS—Arthur S. Allen, 527 Fifth Ave., New York, N. Y., has designed a showing of 10 different colored labels in a folder mounted on emery unifoil.

LETTERPRESS—Bulletin 209 devoted to Type 3G letterpress for producing work such as paper bags, box wraps, container blanks and match boxes has recently been issued by Chambon Corp., Garfield, N. J.

PACKAGING—"The Packaging and Bottling Sample Kit" published by Pneumatic Scale Corp., Ltd., Norfolk Downs Station, Quincy, Mass., presents a display of practical packaging and bottling materials, and is available only to mnufacturers now operating such plants.

PACKAGING—Twelve actual case histories of successful packaging are illustrated in "Profit Packages" by The Hinde & Dauch Paper Co., Sandusky, Ohio.

PACKAGING—Stokes & Smith Co., 4928 Summerdale Ave., Philadelphia, Pa., have published Form 4928 dealing with their complete line of packaging and wrapping equipment.

WRAPPING MACHINES — Model CM-2 for wrapping 250 to 380 packages per minute, Weiss Speedry Press combining printing with wrapping, and Model FA-Q which may be adjusted for wrapping different size packages in 10 minutes are illustrated in a folder by Package Machinery Co., Springfield, Mass.

Miscellaneous

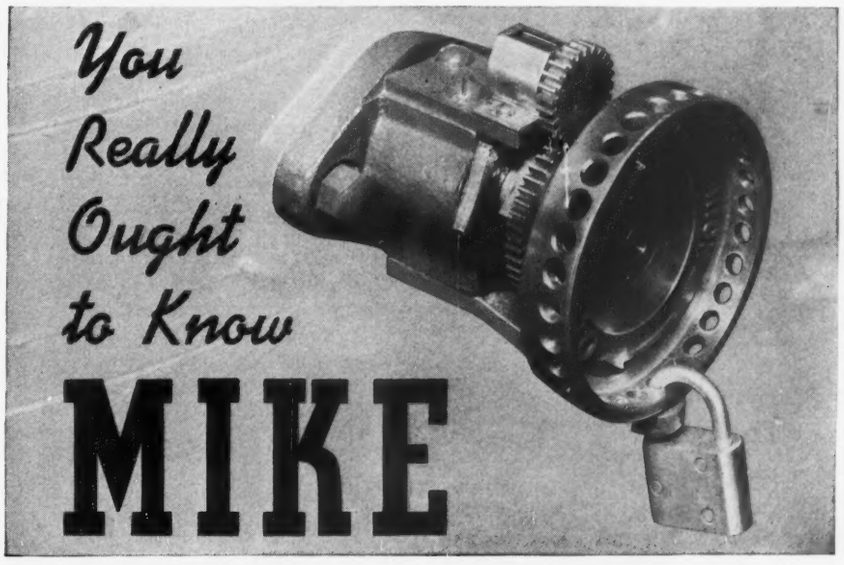
FIRST AID EQUIPMENT—A new catalog devoted to industrial first-aid supplies has been issued by Davis Emergency Equipment Co., 55 Van Dam St., New York, N. Y.

ESSENTIAL OILS—Fritzsche Brothers, Inc., 76 Ninth Ave., New York, N. Y., have recently issued the September, 1939, wholesale price-list of essential oils, aromatic chemicals and allied products.

GAGES—A complete gage guide introducing the new laboratory test gage has been published by Ashcroft American Gage Division; Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

VALVES—The "Inside Story" of Jenkins 125 lb. iron valves has been issued by Jenkins Bros., 80 White St., New York, N. Y., as Form 183.

VITAMIN CONCENTRATES — Vitamins, Inc., 2626-40 S. Dearborn St., Chicago, Ill., has published "Add This New Sales Ingredient to Your Product" dealing with Vitamin D Concentrate "De Liquid".



Mike is *some* watchman! Mike never needs a cup of coffee, has no curiosity, never gossips, never gets drowsy, never asks for a relief, never ducks for a smoke, never moves without authority.

Mike *really watches* heating operations in high temperature cooking, roasting, baking and can making, and watches the gas bills, too! Mike is the micrometer adjusting wheel that controls the valve action of the Kemp Industrial Carburetor, which in turn provides 100 percent premixing of gas and air, allowing accurate automatic control of flame pressure and flame characteristics, allowing flame application in enclosed chambers, *even in solutions* . . . with fuel savings of 15 to 50 percent. Like to hear more? Address The C. M. Kemp Mfg. Co., 405 E. Oliver Street, Baltimore, Md.

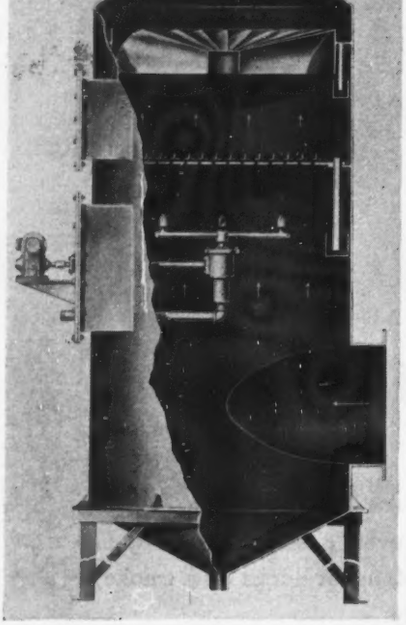
KEMP of BALTIMORE

Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Air Scrubber

PEABODY ENGINEERING CORP., 580 Fifth Ave., New York, N. Y., has developed a scrubber for removing dust, vapor or other particles from gas or air. This is called the "Triple Action" scrubber, separation being in three steps. Air enters near the base



Scrubber for removing dust or other particles from air

of the scrubber, where it is first subjected to cyclonic movement to remove coarse particles. Next, the air passes through a zone of slowly rotating liquid sprays. Finally, the scrubbing action is completed by passage through a baffle plate zone. In the outlet are located eliminator vanes, to remove any entrained scrubbing liquid from the air.

Container Handling System

CLARK TRUCTRACTOR, Battle Creek, Mich., has developed a handling unit and system for reducing the costs of loading and unloading freight cars. It involves the adoption of standard packages and assemblies of packages that are fastened with steel straps to skid platforms upon which the packages remain from point of packing to point of use. By this system, handling costs are said to be reduced at every handling point.

To handle these loaded skids, the Clark "Carloader" has been developed, a gasoline engine powered lift truck built in eleven models and in 2,000; 3,000; and 3,500 lb. capacities. This truck is equipped with fingers that will pass under a load with as little as 2 in. under clearance. Maximum lift is 9 ft. in 14 seconds. Speed is 1 to 7 miles per hour. Width of truck is 38 in.

With this truck it is claimed that one man can load or unload freight cars or can handle loads into or out of storage.

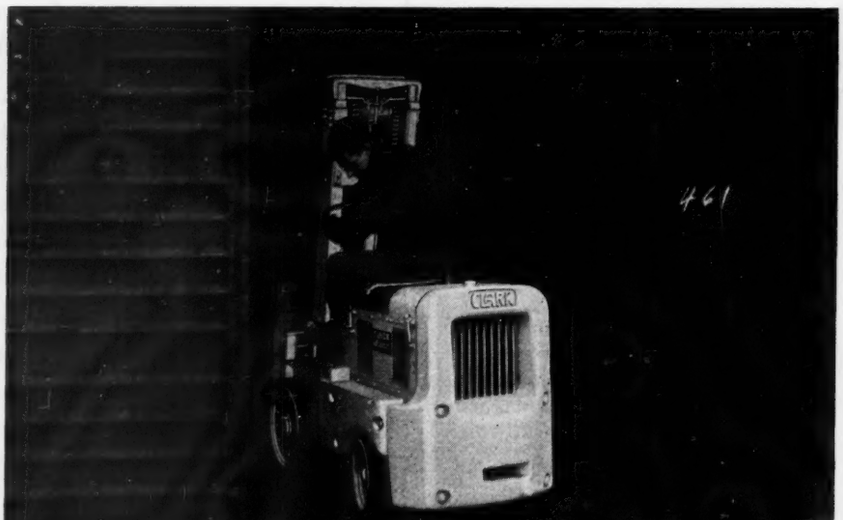
Portable Case Conveyor

FOR HANDLING cases, cartons, and similar containers in canning plants, bottling plants and for similar work, Alvey-Ferguson Co., Inc., Oakley Station, Cincinnati, Ohio, offers the "Port-Low" conveyor. This is a wheel conveyor of three-row type, having ball-bearing wheels or rollers spaced on 4 or 8 in. centers, with the center row of wheels placed in staggered relation to the two outside rows in order to provide better support for the object being conveyed. The "Port-Low" comes in 10 ft. sections, light enough for easy handling by one man (68 lb. each). Curved sections, both right and left, are also available, with side guards when needed. Supports, constructed of angle iron and adjustable 6 in. up or down in height, are provided with 3 in. ball bearing casters. Sections of conveyor join together by means of a single pin.

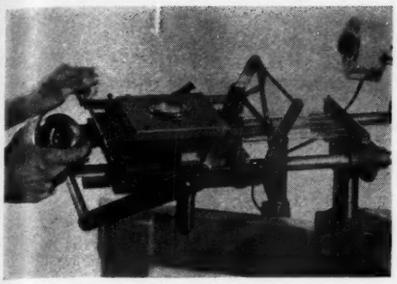
Pliofilm Wrapping Machine

A STRETCH-WRAP MACHINE for packaging individual items of miscellaneous shapes in Pliofilm has been developed by Fred Pfeiffer for Goodyear Tire & Rubber Co., Akron, Ohio. This machine operates by heating the Pliofilm, so that it is stretchable and also will heat seal. In addition to these qualities, heated Pliofilm has increased strength when stretched and high resistance to puncture, so that it can be readily applied to irregular shapes.

In the illustration the machine is shown as the operator is about to wrap



"Carloader" truck handling cartons into box car



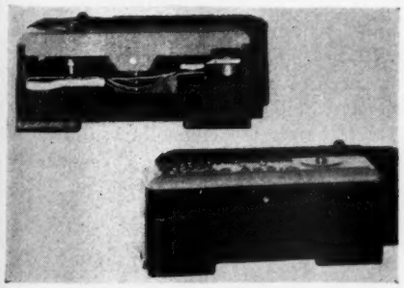
Stretch-wrap machine for use with Pliofilm

an apple. The electric heater is in place over a length of the Pliofilm and the operator is watching the heat gage. When heating is completed, the heater will be swung back out of position. Then the operator will place the apple on top of the transparent sheet of Pliofilm with one hand and, grasping it from below, pull it downward and twist several times. This will cover the apple with a skin-tight transparent wrapping, heat-sealed at the twist. The sheet is cut off above the twist and the machine is then ready for the next wrapping operation.

Small Precision Snap Switch

MICRO SWITCH CORP., Freeport, Ill., has developed a snap-action switch that measures 2 in. in length, 11/16 in. in thickness and $\frac{7}{8}$ in. in height and is rated for 10 amperes at 125 volts a.c., or 5 amperes at 250 volts ac. In the regular type, a pressure differential of 3 to 4 oz. is sufficient to operate this switch. The movement differential is 0.001 in.

There is also a super-sensitive type with a pressure differential of 1 oz.



Cut away view of small snap-action switch

and a movement differential of 0.0001 in. Both types are available as normally open switches, normally closed switches, or double throw switches. All switches are mounted in molded plastic casings. These switches are listed by the Underwriters' Laboratories.

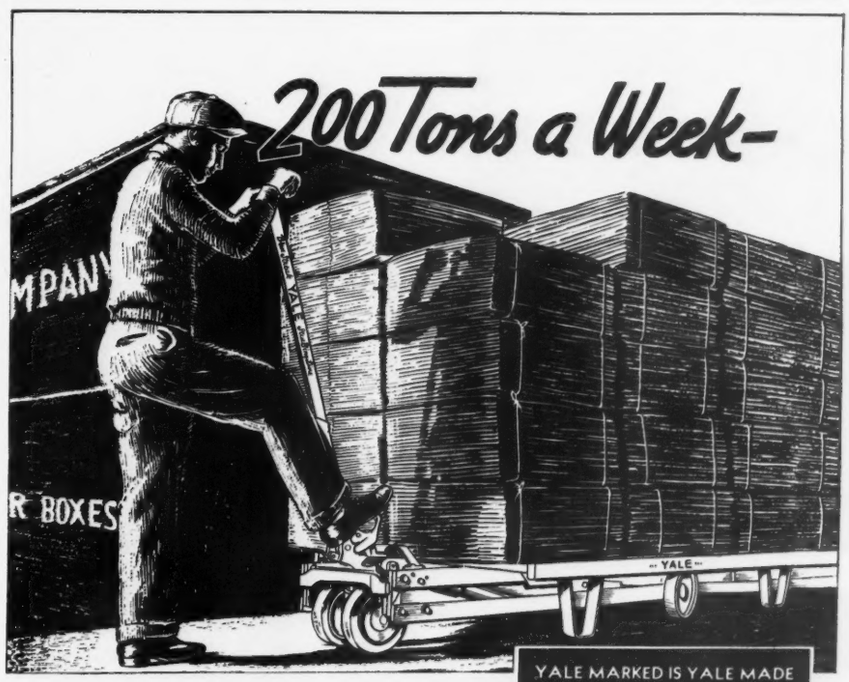
Prospective application of these switches is in various sensitive control systems for machines, motor valves and similar devices.

Rotary Cutter

ABBE ENGINEERING CO., 50 Church St., New York, N. Y., has developed a new design of rotary cutter with a solid rotor to which the knives are attached and which serves as a flywheel. It is said that this design of rotor carries less material around with it, thus bringing material into more frequent contact with the knives, resulting in faster operation and less heating. The rotor design also permits the short knives to rest against the shoulder for the full width of the rotor. In addition, the solid rotor design makes cleaning easier.

Absorber for Air Lines

TO REMOVE fermentation vapors or other objectionable odors from compressed air lines, W. B. Connor Engineering Corp., 114 East 32d St., New York, N. Y., has developed the "Dorex" pipe line absorber. This unit is designed for installation in the air pipe line and contains a "filter" of



HANDLED BY YALE LIFT TRUCKS

200 tons of corrugated boxes a week—a lot of paper for *any* trucks. But that's the job that YALE Lift Trucks perform for the Great Southern Box Company every week in the year. And perform perfectly!

Following are some excerpts from a letter written by Mr. A. O'Shaughnessy, Vice-President of the Great Southern Box Company:

"The YALE system of hand lift trucks and skid platforms is the most efficient system of handling our product that we know of. We could not do without it. Maintenance cost is remarkably low—practically nothing. The Blue Streak is the easiest and fastest truck to operate that we have ever used. It is impossible to get a 'flying handle', and we have never had an accident of any kind. *You cannot improve on YALE service.*"

"You Cannot Improve on Yale Service"—the keynote of YALE success!

Every truck that leaves our plant is the best of its kind. The safest—the most economical—the most efficient. Profit by the experience of industrial executives like Mr. O'Shaughnessy. BUY YALE!

Look in the phone book for your nearest YALE representative.

YALE MARKED IS YALE MADE

YALE TRADE MARK

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

activated coconut shell carbon. It is claimed that the unit will remove odors and vapors which cannot be stopped by condensers, separators or after-coolers.

Small, Heavy-Duty Hoist

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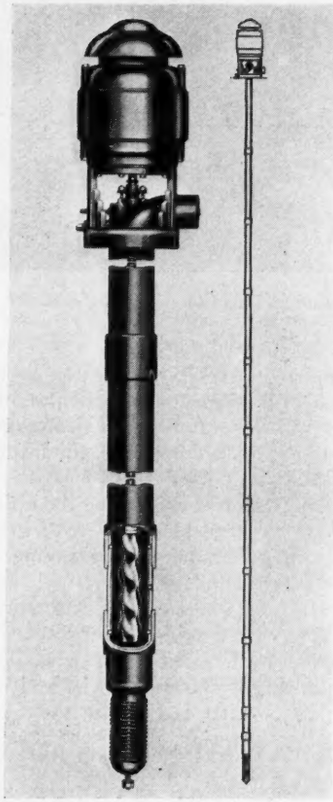
Deep Well Pump

PEERLESS PUMP DIVISION, Food Machinery Corp., 301 West Avenue 26, Los Angeles, Calif., has brought



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Screen for Waste

LINK-BELT CO., 307 N. Michigan Ave., Chicago, Ill., has developed a mechanical vibrating screen for the removal of solids from factory waste water. This screen has screening surface of 2x4 ft., or 4x5 ft., and employs a fine-mesh stainless steel screen cloth. The unit is supplied with a collecting tank. The motor, mounted on top of frame, is 1 or 2 hp., depending on size of unit. The mechanical vibration of the screen is said to be sufficient to keep it clear of solids, so that washing or spraying of the screen is unnecessary.

All these widely different packages, and many others of equally distinctive appearance, are wrapped on our versatile FA machines.

Versatility

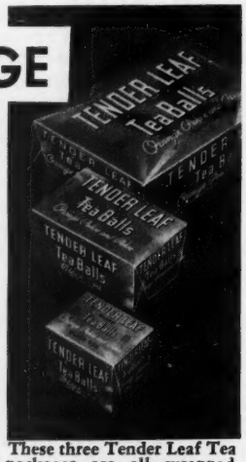
PLUS WIDE SIZE RANGE

All the widely different products pictured above are wrapped on our FA type machines. Moreover, in addition to this versatility, the FA is designed to handle an extremely wide range of sizes.

Changes from one package size to another are quickly and easily made by simple hand-wheel adjustments. The FA can be equipped to handle any type of wrapping material—glassine, foil, transparent cellulose, waxed paper, or plain paper wrappers. May be provided with Electric Eye for accurate registration of printed material fed from a roll.

Because of its outstanding advantages, the FA has won remarkable popularity during the comparatively short time it has been on the market. It is a machine you cannot afford to overlook in your consideration of new wrapping equipment. . . . Consult our nearest office.

Write for literature



These three Tender Leaf Tea packages are all wrapped on one FA machine.

PACKAGE MACHINERY COMPANY, Springfield, Massachusetts

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Peterborough, England: Baker Perkins Ltd. Melbourne, Australia: Baker Perkins Pty., Ltd.
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PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

Pickle Salting

(*Continued from page 618*)

until you have used 210 lb. of pepper hulls and 42 lb. of salt. Then fill the barrel full with 90 deg. Sal. brine and lay the barrel head on the top of the barrel. Be very sure that all the peppers are held under the brine. Let the barrel settle for 24 hours, or until you can add 60 lb. more of fresh pepper hulls and 12 lb. of salt.

A 45 gal. barrel of properly packed pepper hulls should contain 285 lb. of salted hulls, this weight being a drained weight on a ¼ in. screen for two minutes.

If the salting is carefully done, the salt absorbed by the hulls will make up the 15 lb. difference between the 270 lb. of fresh hulls and the 285 lb. of salted hulls.

Salting Pepper Hulls in Tanks

Place about 6 in. of 90 deg. Sal. brine in the tank and then dump the cored, seeded and washed hulls into the tank, being sure to spread them evenly over the entire tank. Add 20 lb. of salt for every 100 lb. of hulls put into the tank. When the tank is full, place the cover on carefully and key it down. Now add 90 deg. brine, filling it well over the top of the cover. Add additional salt and 90 deg. brine from time to time as needed to hold the test at 90 deg. Sal. Pump the tank as often as necessary to equalize top and bottom brine densities.

Pepper hulls salted in barrels are much better and cheaper in the end, for there is little waste in barrel salting, whereas in tanks the waste will exceed 10 per cent.

The labor and salt cost will average about $1.75 per 45-gal. barrel.

Salting Dill Weed

Prepare a tank by thoroughly washing and sterilizing as was described under pickle salting. Place 10 in. of 60 deg. Sal. brine in the tank and dump the fresh dill weed into it. Have it packed down tightly by tramping by men wearing clean, high rubber boots. Continue filling the tank in this manner until the tank is filled within 10 in. of the top. Then place the cover on the tank and key it down securely and fill tank with 60 deg. Sal. brine until the brine is 3 to 4 in. above the cover. After this, pump the tank thoroughly and repeat this pumping each day for four days. Should the brine fail to test 60 deg. Sal. add more salt until 60 deg. is reached. Keep the tank at 60 deg. test and never lower.

Dill weed "heats" very quickly and care must be taken that heated weed is not salted. Dill weed must be salted on the same day it is cut *and not held overnight!*

If dill weed is to be salted in barrels, pack a clean barrel as full of weed as possible, pressing it tightly into the barrel in layers by using a long lever and a block to insure a tight pack. Then head up the barrel and fill through the bung with 60 deg. Sal. brine. After the barrel has been packed for two weeks, rebrine it through the bung with 60 deg. brine.

In buying dill weed, care should be taken to prevent any foreign weed or plant from being salted with the dill weed, as the dill flavor is changed or even ruined by foreign plants.

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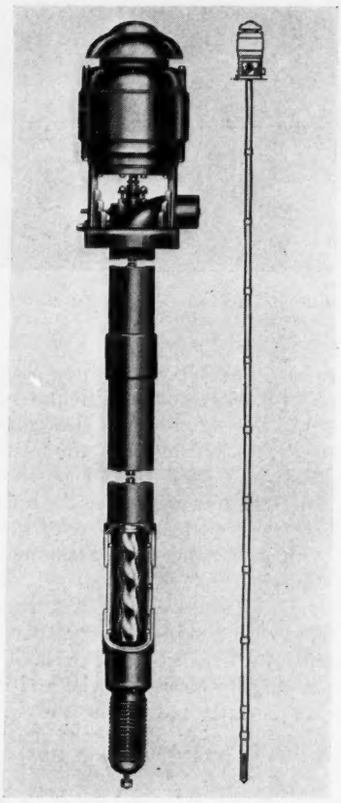

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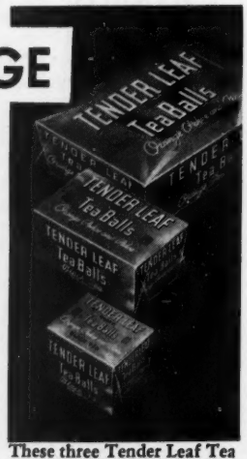

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THE CONEWANGO REFINING CO.
WARREN, PENNSYLVANIA

(Continued from page 615)

ness from a pound. Both influence other product characteristics. The food manufacturer, therefore, may choose between these competing sugars, or may decide to use a mixture of them that will give him in his product that degree of sweetness and other properties which he thinks his ultimate customers most desire.

This matter of sweetness is one which has caused considerable argument in the food standards hearings of Washington. Some of the government men have apparently concluded that the more sweetness one can get the better. On this basis it has been proposed that when dextrose replaces sucrose there should be required more than a pound for pound substitution. Advocates of dextrose object to this. They say that in many cases the customer wants the food value of the less sweet sugar without being compelled to take the greater sweetness which the sucrose gives.

There seems to be no general conclusion that can be drawn except that the food manufacturer should be the one to judge as to how sweet a product he wishes to make and market. Since he does not depreciate the food value of his product by changing from one sugar to another, it appears logical that he should be given the full privilege of choice in this particular.

It is generally agreed that many products can be so sweet that the flavor characteristics of the other components may be altered. The fruit flavors used in delicately flavored carbonated beverages, or in certain mixed dessert powders or like products, can be cited as evidence of this. Producers of dextrose argue from this fact that it is most desirable to provide some of the sweetening agent for such mixtures in the form of dextrose, which will give its full food value to the product without masking the other flavors. Obviously this, too, is a bitter battleground between the two competing sugar groups.

With certain foods, texture is a characteristic that can be more or less precisely observed. Take jams and preserves, for example. It is not difficult to determine between jams made with sucrose alone and those made with various mixtures of sucrose and dextrose as to what is the relative fluidity or the relative firmness of the product at any given temperature. If corn sirup be used in part, its contribution to the texture of the jam is also readily observed.

Many other food manufacturers considering a choice among these sweetening agents must take some account of this characteristic of texture. Of course, in making this choice as to texture, they must not forget the sweetness or the other flavor characteristics. Their decision must be based on a balance between the various changes in characteristics. They will choose the sweeteners so that they may get what they consider a most advantageous combination of these various properties.

Sugar Separation

In certain products, jellies for example, some of the sugar may separate out into a crystalline form, and give a hard crunchy characteristic that is most undesirable. There is no need for getting such a result. But it is possible if one neglects quality control or if one uses too much of the wrong kind of sweetening agent. For a similar reason it is not safe to use too much of less soluble sugars in certain preserve or jelly formulas.

To control the staling phenomenon

HOWELL Splash-Proof MOTORS
Twice Protected Against Moisture!
1— HOUSING PROTECTION
An umbrella is standard protection in wet weather—but an umbrella plus a raincoat is much safer.
The standard way to insulate the windings of a splash-proof motor against moisture damage is by means of a specially designed motor housing. Every motor manufacturer offering a splash-proof does that, including HOWELL.
2— INSULATION PROTECTION
But HOWELL isn't satisfied to stop there! We HOWELL-BOND our windings, using an insulating varnish that is WATER-PROOF—and it's BAKED on!... This is the EXTRA "raincoat" protection you get in HOWELL-Splash-Proof Motors (½ to 75 H.P.), which out-perform and out-last other types. Try JUST one!
Use HOWELL Splash-Proofs to CUT COSTS in wet or humid atmospheres, or where motor is subject to splashing or dripping liquids.
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Make Good on Hard Jobs
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in such things as cake, pastry, and other bakery goods, the use of corn sirup has been developed recently. The combination of edible dextrines and reducing sugars of this sirup is said to contribute new properties to the baked goods and preserve them in a fresh condition somewhat longer. Few bakers have yet developed adequate knowledge of these characteristics, in order fully to use such information in the modification of bakery formulas. But changes in this direction may come in the future.

In the case of some types of confectionery, there are certain properties which can best be obtained with the use of corn sirup. The properties contributed cannot be obtained with other sugars.

Also, some expert opinion is to the effect that corn sirup contributes a "brilliance" to jam and jellies.

The Ultimate Test

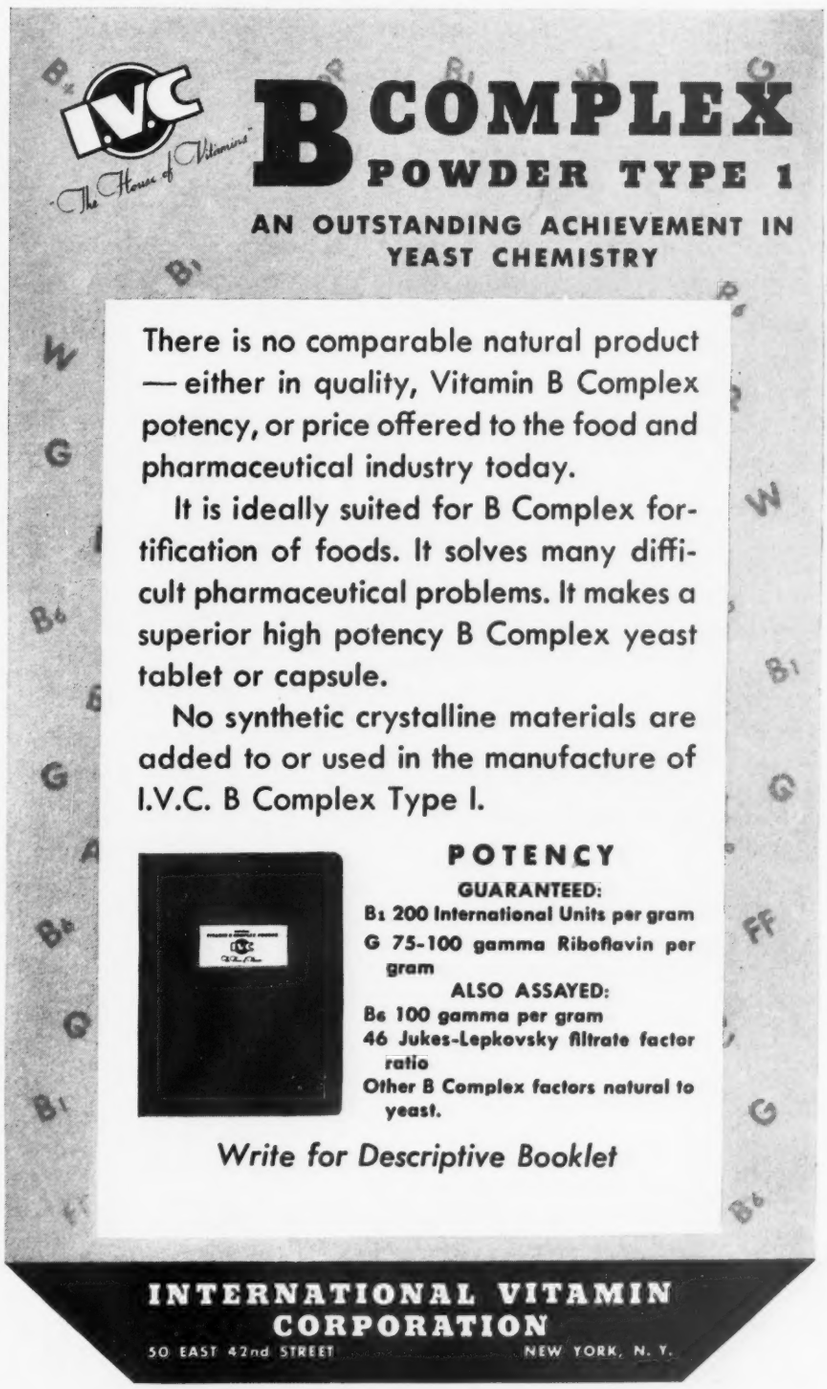
Those who eat the foods should make the ultimate decision regarding the sweetening agent to be used by considering the characteristics they find in the product. That sounds impossible, but it is not. The customers will decide as between one formula and another by that most effective method which they use at the grocery store. They will buy the products whose over all properties they like, and which they can get at a satisfactory price. They will pass by those which seems less attractive to them.

This means simply that the food manufacturer must have freedom of selection as between various sweetening agents and their mixtures. There is no reason to suppose that any large number of companies is going suddenly to substitute one sugar for another. Mixed sugars are much more likely to be used extensively for many purposes. Dextrose and corn sirup can be and will be used alone under many circumstances, but certainly not universally.

Fortunately, the customer's choice as to what she and her family like is a safe guide in the sweetener competition. All of these carbohydrates are digestible. All of them are changed in the stomach and digestive tract to form either dextrose or levulose. The dextrose goes into the blood stream and can feed the body directly. The levulose goes by way of the blood to the liver where it is converted from levulose into dextrose. Then it is available for use by the body. This two-stage assimilation cannot properly be used as an argument against sucrose and for dextrose alone.

There are certain contingencies which may arise in the present war to make these matters of carbohydrate choice more pressing in the future than in the past. Questions of cost and of availability may become operative. Some even go so far as to argue that the thing which, in the present war period, will keep sugar from being costly or difficult to get is the wide availability of the other carbohydrates.

Certainly the manufacturers of foods who buy substantial quantities of sweetening agents should study this problem, so that they may be ready to adapt their manufacturing practice to any economic conditions that may arise. They cannot be expected to use dextrose or corn sirup instead of cane or beet sugar without opportunity to prove that the quality and the acceptability of their product on the part of the ultimate customers is not hurt. There is no need for lowering product quality when proper carbohydrate choice is made. But hasty, ill-considered formula changes cannot be encouraged even from the standpoint of marketability of product alone.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GUARANTEED:
B1 200 International Units per gram
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B6 100 gamma per gram
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NEW YORK, N. Y.

(Continued from page 640)

stead of 20.38 per cent) than by the extraction method. The bran cake remaining after oil recovery averages moisture 8, oil 8.7, starch 18, protein 15.8 and ash 11 per cent. It is comparatively rich in phosphorus (4.1 per cent, calculated as phosphoric acid anhydride).

Digest from "Rice Bran as a Raw Material of Oil," by Tei Hidaka, *Journal of the Society of Chemical Industry, Japan*, 42, 219B, 1939 (Published in Japan).

SEAFOOD

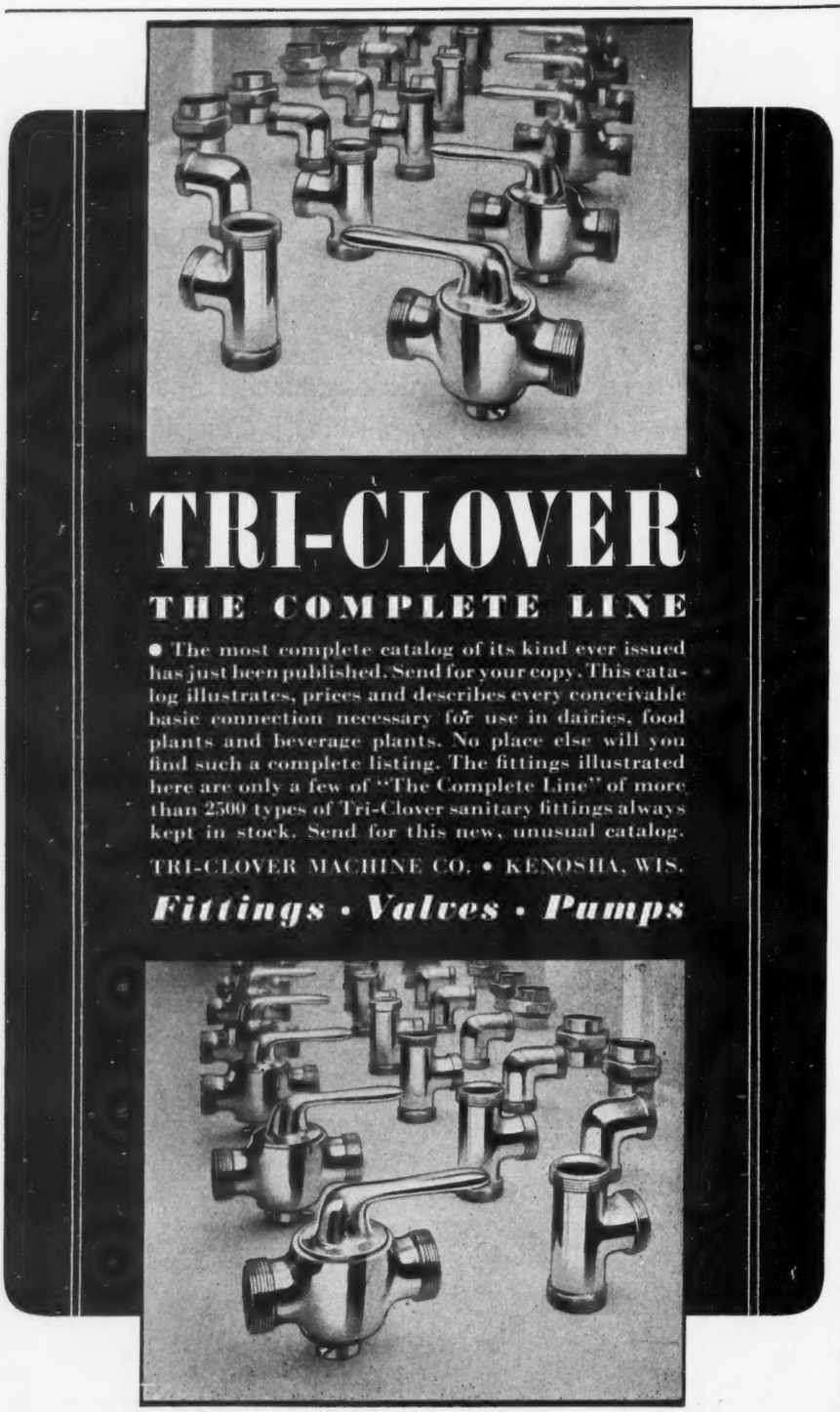
Washing vs. Soaking Clams

SOFT-SHELL CLAMS are sold usually after removal from the shell. Unfortunately these clams must be washed after shucking in order to remove extraneous dirt and make them merchantable. During this washing process a certain amount of water is absorbed, and if the clams are allowed to remain in fresh water for a sufficient length of time an absorption of water to the extent of 50 per cent can take place. It is a relatively simple matter to make one gallon of dry clams from three quarts of washed clams and one quart of water.

Many questions relating to this matter have been raised during prosecutions for violation of the food law. In order to answer these questions, clams were collected during the rain and after digging were allowed to remain in the rain outdoors overnight. Clams were also collected during the spawning season and from flats flooded by much fresh water at low tide. The total solid content of these twenty-two samples averaged 20.05 per cent. Clams in the shell were also obtained from shucking plants. The average total solids of these clams was 20.60 per cent. Clams were commercially washed in our presence, and clams from different beds were obtained by the inspectors and were washed in the laboratory. The apparent loss in total solids of the commercially washed clams averaged 12.30 per cent, and of those washed in the laboratory the loss averaged 10.04 per cent. From these figures the authors believe that a standard of 18 per cent for the total solids of shucked clams could be complied with by the trade.

The method of analysis is as follows: The clams were placed in a sieve and allowed to drain with shaking for about 30 seconds. The drained clams were then passed through a meat chopper and finely ground. The entire ground portion was then thoroughly mixed prior to removing samples for analysis. The total solids were determined by evaporating a weighed portion to dryness in a platinum dish on a steam bath.

Digest from "Soft-Shell Clams—Washing vs. Soaking," by Carl S. Ferguson and Hermann C. Lythgoe, Massachusetts Department of Public Health. Presented at American Chemical Society, Boston meeting, September. 11–15, 1939.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● The most complete catalog of its kind ever issued has just been published. Send for your copy. This catalog illustrates, prices and describes every conceivable basic connection necessary for use in dairies, food plants and beverage plants. No place else will you find such a complete listing. The fittings illustrated here are only a few of "The Complete Line" of more than 2500 types of Tri-Clover sanitary fittings always kept in stock. Send for this new, unusual catalog.
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SUGAR

Sugar Dust Hazards

THE PROPERTIES of sugar dust which enable it to accumulate an electric charge, thus becoming an explosion hazard, include the piezoelectric behavior of fine crystalline sugar particles and the film of absorbed water vapor enveloping the particles. Purity of the sugar has considerable influence. In the final raffinate, electrical sensitivity increases as the moisture content increases. When the dust in a room has accumulated a high potential charge, the stability of the charge becomes very low and any condition

which might permit spontaneous ignition of the dust is dangerous. Electrostatic examination of a plant for production of powdered sugar showed only one point in the sequence of operations where a dangerous electrical charge was accumulated. This was in the air classifier.

Digest from "Electrostatic Charges on Sugar and the Resulting Explosion Hazards in Mixtures of Sugar Dust and Air," by Ernst Burkhardt, *Zeitschrift der Wirtschaftsgruppe fur Zuckerindustrie* **89**, 244, 1939 (Published in Germany).

Beet Sugar and Spoilage Bacteria

THE NUMBER OF SAMPLES of beet sugar falling below the National Canners Association standards for spores (total thermophilic, flat sour, thermophilic-anaerobic, and sulphide-spoilage) decreased from 26.2 per cent in 1935 to 14.3 in 1936 and 8.6 in 1937. Flat sour spores are the commonest cause of failure to meet the standard. Storage of the sugar for 8 or 20 months usually results in many of the spores dying out, chiefly during the early part of the storage period.

Digest from "Survival of Thermophilic Food-Spoilage Organisms in Stored White Beet Sugar," by H. H. Hall, *Food Research*, **4**, 259, 1939.

MISCELLANEOUS

Noncaking Powders

CALCIUM CITRATE, partially or wholly dehydrated, has been found effective as an agglomeration inhibitor in hygroscopic powders. As its use is disclosed in British Patent 495,239 (granted Feb. 2, 1939, to E. Aleckerle and assigned to Chemische Fabrik J. A. Benckiser Gesellschaft, Ludwigshafen, Germany), the presence of calcium citrate prevents caking in a wide variety of powdered food products which attract moisture from the air. Among them are common salt, fruit salts, coffee (or coffee substitute) powders, baking powders and the salt mixtures which are used to prevent coagulation of blood in freshly killed animals in slaughterhouses. In these last preparations, calcium oxide and citric acid may be added separately, to form calcium citrate *in situ*.

Germany Prepares to Eat Potato Peelings

THERE WAS NO successful utilization of potato byproducts until peelings began to receive separate treatment. In starch manufacture, for example, use of peeled potatoes has several advantages, chief among them being purer starch obtained with less wash water, and recovery of valuable vitamins and other nutritional elements from the peelings.

Among the products obtainable from potato peelings are enzymes; active carbon; vitamin-enriched protein food preparations; health bread; artificial cork; agents for clarifying oils, wine, sugar and other products; vitamins; tooth powder or paste, and cosmetics.

Cleanliness and quality of potato peelings for food use must be carefully safeguarded. Thickness of peelings can be adapted to the intended use. Acetic acid is useful when a preservative is needed.

The peelings may be dried on trays in vacuum, or in an air current at 104 deg. F. When finely powdered, the product is quite palatable and as much as 20 per cent of the powder may be used as an addition to cereal flours instead of using potato flour.

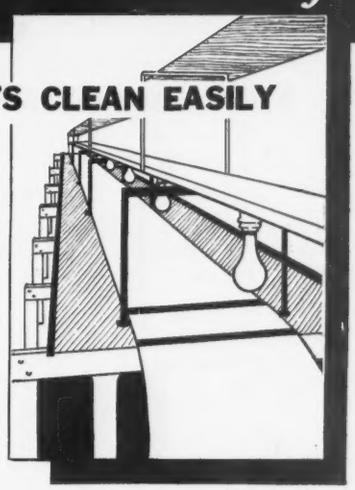
Digest from "By-Products From Processing Potatoes," by Gustav Schuchardt, *Chemiker-Zeitung*, 63, 557, 1939 (Published in Germany).

Two more TOUGH Cleaning Problems MADE EASY with Oakite Cleaning

KEEPS CONVEYOR BELTS CLEAN EASILY

Keeping rubber conveyor belts scrupulously clean was a difficult problem for one Midwestern canner until a recommended Oakite material was tried.

This plant finds that it provides thorough, rapid cleaning action and unusual free-rinsing properties. No juice or vegetable particles remain on conveyor belt surface to affect taste or flavor of products packed. Another important factor is that the material does not harm rubber as harsh alkalies often do.



PROTECTS PRODUCT QUALITY THIS WAY

Here is the method found most effective by one Eastern packer of fruit juices for keeping equipment in highly sanitary condition. Vats and pipelines are first thoroughly cleaned with an Oakite material, and are then sterilized by spraying and circulating with an Oakite Bactericide solution. The result . . . spoilage losses are avoided . . . sanitation is easy, economical.

Whatever product you pack, you will find one or more of the 53 different Oakite materials a definite aid in safeguarding product quality, by providing the improved cleaning and sterilizing results you want. Write for specific, money-saving data on your problems.

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OAKITE PRODUCTS, Inc., 26G Thames St., New York, N. Y.
Representatives in All Principal Cities of the U. S.

OAKITE
CERTIFIED CLEANING
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Formulas

(*Continued from 641*)

Glycerine	**½ gal.**

Cool, then add:

Vanilla extract	**4 pt.**
or vanillin, dissolved in 1 qt. of hot water	**10 grams**

Any cocoa may be used, but one of the less expensive types made from Accra or Bahia beans is best. From 5 to 10 per cent of the beans should be roasted high, i.e. nearly burned.

Sodium benzoate dissolved in water, as directed, is an easy way to add this ingredient. The water in which it is dissolved is a part of the formula.

Glycerine is used here to prevent crystallization of sugars, but, if the price of glycerine is very high, corn sirup will do a fair job in its place.

Vanillin has more lasting properties if the chocolate sirup is served hot. This is desirable because the amount of benzoate permitted by law is not sufficient to prevent mold growth.

Formula by David Algie

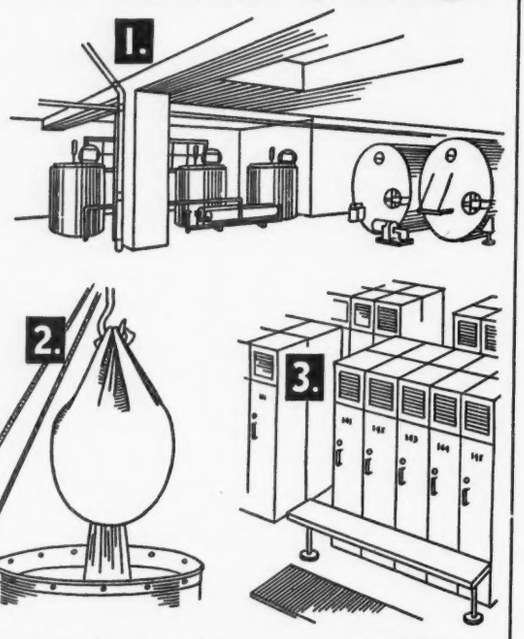
LET HTH PRODUCTS*

Preserve Purity Prevent Spoilage

1. In thousands of dairy plants throughout the country, HTH Products are proving their effectiveness every day in controlling bacteria on equipment of every kind—receiving tanks, holding tanks, filters, coolers, pasteurizers, bottle-fillers, sanitary piping, etc.—and doing it quickly, positively and economically. Bottles, too, are safer when the final rinse solution is made from HTH Products.

2. Cheese bags used to present a difficult problem, but not since cheese plants discovered the effectiveness of HTH Products. Now they simply wash bags in hot water and an alkali cleanser, rinse in warm water, immerse in a 200 p.p.m. solution for a few minutes, then rinse out the remaining chlorine solution. Throughout the plant, too, they use HTH Products for controlling bacteria.

3. Modern food plants not only drill their employees constantly on the necessity of bacteria control in the plant, but maintain a rigid sanitary routine *everywhere* on the premises, including cafeterias, recreation rooms, locker rooms, toilets, etc. And they find HTH Products just as effective for deodorizing and disinfecting in such areas as for bacteria control in the plant itself.



Food and beverage plants find that HTH Products offer an effective means of combatting bacterial contamination that results in a real dollars and cents saving.

Let HTH Products show what they can do in *your* plant. These dependable chlorine sterilizers come to you in powder form, convenient to use.

Added to water, they make quick-acting germicidal hypochlorite solutions of the desired strengths for wiping, flushing or spraying all surfaces with which food or beverage products come in contact. HTH Products are so economical, they may be used freely. They do a thoroughly effective job.

Write today for full information about HTH Products and their use.

HTH PRODUCTS

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42ND STREET, NEW YORK, N. Y.

*HTH PRODUCTS (HTH, HTH-15 and LO-BAX) . . . DRY ICE . . . CARBONIC GAS . . . AMMONIA, ANHYDROUS and AQUA . . . CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . PH-PLUS (FUSED ALKALI)

FORMULA NO. 17

Devils Food Cake Made with Lard

Part	Ingredient	Amount gm., oz. or lb.
1	Cake flour	20
	Cocoa	20
	Lard	40
2	Egg whites	50
3	White sugar	50
4	Cake flour	80
	Brown sugar	90
	Baking powder	4.3
	Baking soda	3.3
	Salt	2
	Milk	85
5	Water	60
	Vanilla	2
	Total	506.6

Working Directions

1. Blend Part 1 for 5 minutes on second speed.
2. In a separate bowl beat Part 2 on high speed until it begins to stiffen. Reduce speed to medium, continue beating, and add Part 3. Beat until as stiff as possible. Set aside.
3. Return Part 1 to the machine and add Part 4 all at once. Mix 5 seconds on second speed, scraping down as needed.
4. Add Part 5 all at once. Mix 5 minutes on second speed, scraping down as needed.
5. Add the beaten eggs (Part 2) to the batter and work in by machine on first speed for 1 to 2 minutes, scraping down once.
6. Bake at 360–375 deg. F.

Formula from Institute of American Meat Packers

FORMULA NO. 18

Fruit Acid

Citric acid, granular	**24 lb.**
Make up with water to	**8 gal.**
Production	**8 gal.**

Formula by David Algie

FORMULA NO. 19

Crushed Pineapple, or Pineapple Topping

Crushed pineapple, No. 10 tins	**60 cans**
Fruit acid	**8 oz.**
(see Formula No. 18)	
Sodium benzoate in 2 qt. water	**8 oz.**

Sugar (sucrose)	**300 lb.**
Production	**30 gal.**

Drain 23 gal. of juice from the crushed pineapple and store for later use in making pineapple sirup (Formula No. 20). Add acid and benzoate of soda to drained crushed pineapple, and stir until the sugar is all wet. Then heat to 180 deg. F. with constant stirring.

Better results are obtained, both as to color and flavor, if Hawaiian pineapple is used. The grade known as "Confectioners in Juice" should be used.

Formula from David Algie

FORMULA NO. 20

Pineapple Sirup

Pineapple juice	**100 gal.**
Sugar (sucrose)	**1380 gal.**
Sodium benzoate (dissolved in ½ gal. hot water)	**2 lb.**
Pineapple fruit extract	**400 oz.**
Production	**200 gal.**

Pineapple juice may be bought as such, or the juice may be strained from the fruit used for making crushed pineapple (see Formula 19) and used for sirup. Pineapple concentrate, cut to juice concentration with water, may also be used. Several extract houses put out true pineapple extracts that give very good results.

Formula from David Algie

FORMULA NO. 21

Mayonnaise

Egg yolk (fresh)	**12 lb.**
Sugar (sucrose)	**2½ lb.**
Mustard flour	**1 lb.**
Salt	**1 lb. 7 oz.**
Onion juice (fresh)	**2 oz.**
Paprika	**½ oz.**
Pepper (white)	**½ oz.**
Oil (salad)	**13 gal.**
Vinegar (100 grain, white)	**4 qt.**
Water	**2 qt.**

For this mayonnaise, always use fresh egg yolks. If you cannot purchase fresh yolks, then break your own fresh eggs and separate the yolks.

Mustard flour is available at most spice houses, and is made especially for mayonnaise.

Onion juice, in this formula, is pressed from freshly ground onions.

Oil is purified corn oil. Other salad oils may be used if desired.

The yolks are thrown into the beater bowl. Set beater at high speed. Beat the yolks until they are well broken up which requires about a minute.

Next, add sugar, mustard flour, salt, paprika and pepper, and beat until creamed. This will require from 2 to 5 minutes, depending on the per cent of egg white that adheres to the yolks. The more whites, the longer the time required and also the less desirable.

Now start the oil slowly at first, and then add at the rate of 1 gal. per minute, until 9 gal. have been added.

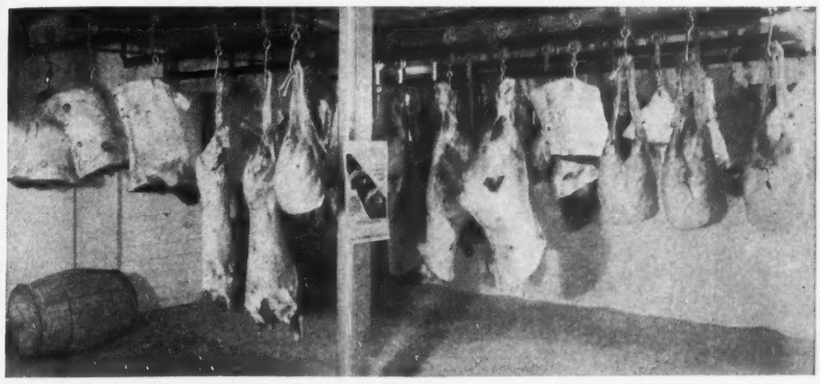
The beater is then run on slow speed while 1 qt. of vinegar and 1 qt. of water are added and thoroughly mixed in.

Now run beater on high speed and slowly add remainder of oil at the rate of 1 gal. every 2 minutes. Shift beater to slow speed, and then add the remainder of the vinegar and water.

Shut off beater. Scrape down sides of bowl. At slow speed, mix entire batch for 2 minutes longer. Long beating of the entire mix tends to make the mayonnaise thinner.

Formula by David Algie

Lafayette's cold storage plant has 500 lockers. This chill room, with a capacity of 175 quarters of beef, is insulated with Mundet's "Jointite" Cork Insulation.



"We cut the Motor off for 24 hours

. . . the chill room lost 3°, the locker room 2° and sharp freezer 3° during that time — it was a swell testimonial to the insulation."

The insulation is Mundet Corkboard.

The letter, from the Lafayette Food Lockers, Lafayette, Indiana, indicates the economy of insulating with Mundet Cork Insulation.

In all low temperature operations, Mundet Corkboard is a dependable barrier to heat infiltration. Through its efficiency the problems of temperature control are simplified and costs of operation reduced. Whether your problem concerns air conditioning or food manufacturing, quick freezing or cold storage, it will pay you to get the facts on Mundet Cork Insulation.

Mundet offices in principal cities offer responsible engineering assistance including complete installation, if desired. We shall gladly submit quotations and recommendations without obligating you. Write today for insulation data. Address Mundet Cork Corporation, Insulation Division, 65 S. Eleventh St., Brooklyn, N. Y.

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BOOKS RECEIVED

Public, Employee Relations

PUBLIC AND INDUSTRIAL RELATIONS IN PRODUCTION. A symposium. Published by American Management Association, 330 West 42d St., New York, N. Y., 1939. 40 pages; 6x9 in.; paper. Price $0.75.

In this pamphlet, James H. McGraw, Jr., writes on "Public Relations —Industry's Major Problem." He gives the objectives of a public relations program and outlines the steps to be taken to attain those objectives. "Time Study Problems Under Collective Bargaining" is covered in a practical manner by George L. Dirks. "Developing a Sensible Personnel Program" is covered in two parts by Samuel R. Sutphin and J. M. Talbot. A discussion on "Job Evaluation and Wage Classification" by W. W. Finlay concludes the symposium.

The men contributing to this symposium are practical authorities on their respective subjects.

Bottling Plant Operation

ABCB PLANT OPERATION MANUAL. Published by American Bottlers of Carbonated Beverages, Suite 224 Southern Bldg., Washington, D. C., 1939. 75 pages; 9⅜ x 11½ in.; loose leaf binding. Price, $3; sold to ABCB members only.

Prepared as a guide to proper operation of the bottled carbonated beverage plant, this manual is something that the bottler should not be without. Not only is the material in the manual right down the alley of practical plant operation, but it is backed up by scientific accuracy and proven by experience. The main part of this manual has sections on bottle washing, water for carbonated beverages, elimination of spoilage, maintaining quality and uniformity and operation of the sirup room. In the appendix are reprints of papers covering plant lighting, plant design, crown handling, safety precautions and satisfactory carbonation.

Broad Picture of Industry

FOODS: PRODUCTION, MARKETING, CONSUMPTION. By Jean J. Stewart. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York, N. Y., 1938. 737 pages; 5¾ x 8¼ in.; cloth. Price, $3.25.

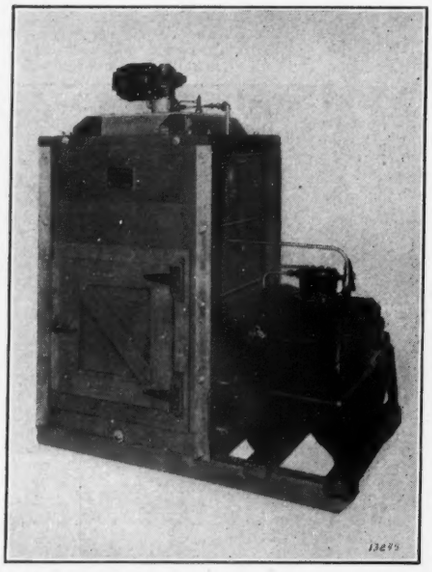
Aimed at the general public, the value of this book to the food man lies in the breadth of the information presented rather than in its specific details. Even so, there are numerous useful charts and tables giving detailed information on production, consumption, composition of foods and so forth. The various chapters of the book cover man's relations to food problems, the starches and sugars, foods rich in starches and sugars, fresh fruits and vegetables, the preservation of foods, fats and oils, dairy products, meat and fish, poultry and eggs, beverages, and the food needs of the individual, the family and the nation.

Chemical Leavening Agents

BAKING POWDERS. By Simon Mendelsohn. Published by Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y., 1939. 178 pages; 5¾x8¾ in.; cloth. Price $4.

The development, chemistry, manufacture and evaluation of chemical leavening agents are covered, from the production as well as the theoretical viewpoint. Each phase of baking powder manufacture is treated at some length, the author supplementing the

10-to-1 You're Paying TOO MUCH for ICE!



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text with photographs of equipment, microphotographs of ingredients, charts and a flow sheet.

While users of baking powders should be familiar with their manufacture, the book's biggest value to them is in its material on the technical evaluation of baking powders.

Pointers on Cost Control

A SYMPOSIUM ON UNIT COSTS. Published by American Management Association, 330 West 42d St., New York, N. Y., 1939. 60 pages; 6x9 in.; paper. Price $1.

Executives from a dozen different industries discuss practices employed in controlling and reducing unit costs. Harry W. Brown, manager of eastern plants for General Foods Corp., cites an instance where costs were cut $50,000 a year by reducing the width of flaps on cartons, by $100,000 in one plant alone by reducing overweight in the package, by $27,000 a year in one plant by replacing 27 small units using gas with three using steam. The ideas embodied in this symposium are cheap at $1.

Survey of Distribution Costs

DOES DISTRIBUTION COST TOO MUCH? By Paul W. Stewart and J. Frederic Dewhurst, with assistance of Louise Field. Published by the Twentieth Century Fund, 330 West 42d St., New York, N. Y. 403 pages; 6¼x9¼ in.; cloth. Price, $3.50.

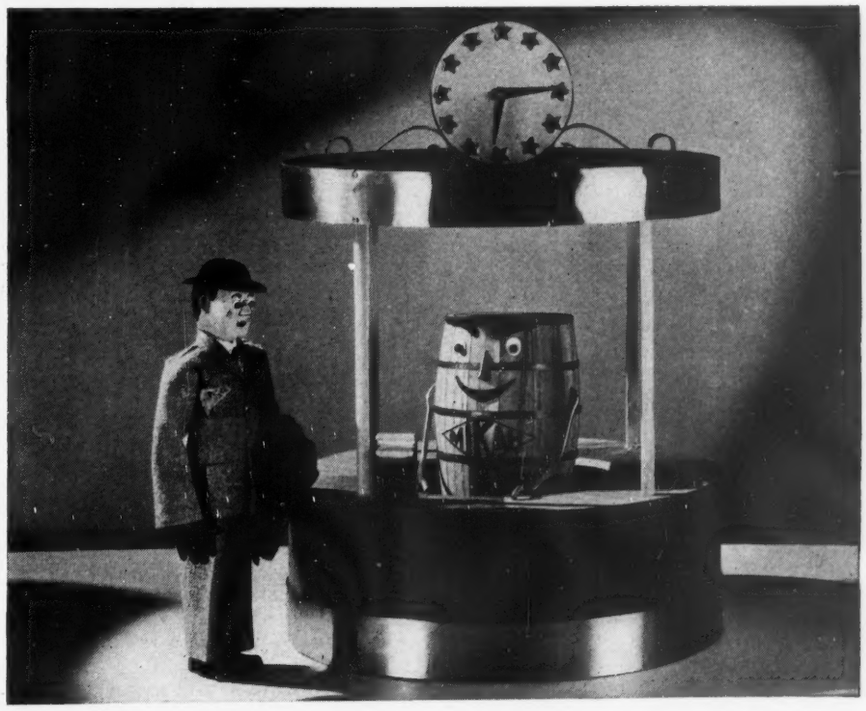
Cabbage leads unprocessed food products in distribution costs, the price spread as of 1935 being 82.5 per cent of the retail price. Eggs were lowest, with 34.2 per cent. The retailers' price spread on meat products (1925–34) amounts to 25.1 per cent of the price to the consumer. One distributor's spread on milk in New York was 60.2 per cent of the selling price. That is the type of information contained in the sections of this work covering food products.

In addition to price spreads, the subjects taken up in different chapters of the book include: "The Challenge of Distribution," "The Flow of Goods Through Distribution Channels," "Distributors at Work," "Costs and Profits in Distribution," "The Cost of Retailing," "Costs of Primary and Intermediate Distribution," "Costs of Facilitating Agencies," "Government Regulation of Distribution," "Some Reasons for High Costs," "Conclusions and Recommendations of the Committee on Distribution."

Twentieth Century Fund obtained the information contained in this book through research conducted by a special staff. Then the committee on distribution, with these facts as a basis, formulated a series of concrete recommendations intended to improve methods and reduce costs of distribution.

Among the conclusions is one that distribution is a more wasteful and inefficient process than production but that there is little evidence of general high profits in the distribution field as a whole. And the significant observation is made that distribution costs have been increased by one of the changes which has appreciably reduced production costs, namely, concentration of production operations in a few centers. Withal, the report concludes that distribution costs are too high, and indicates that distribution can be made considerably more efficient than it is today.

It is important that the food industry, perhaps more than any other, know all the answers to the problem of distribution costs, because the public spends a large portion of its income on food products. And with the pressure increasing for a reduction on these costs, the food industry is a likely first to hear the war cry.



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PATENTS

Dustless Starch Grits Made From Raw Starch and Small Quantity of Gelatinized Starch—Anthony C. Horesi, Berwyn, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,168,524. Aug. 8, 1939.

Sausages Linked During Stuffing by Semi-Automatic Mechanical Means—Charles T. Walter to Industrial Patents Corp., Chicago, Ill. No. 2,168,693. Aug. 8, 1939.

Thermophilic Aerobic Bacteria Fermentation Used to Predigest Mixture of Fish Scrap and Seaweed for Animal Foods—Charles Samuel Townsend, Ealing, England, to Wellesley Holdings Ltd., London, England. No. 2,168,722. Aug. 8, 1939.

Butter Milk, Middlings and Malted Barley Processed to Hydrolyze Lactose of the Butter Milk and Convert Starch of the Middlings to Monosaccharides in Making a Liquid Animal Food—Paul A. Watson, Pasadena, Calif. No. 2,168,724. Aug. 8, 1939.

Oxygen-Containing Air Swept From Bottles Before and After Filling Under Counter-Pressure—James Kantor to Liquid Carbonic Corp., Chicago, Ill. No. 2,168,841. Aug. 8, 1939.

Egg Whites Fermented for Removal of Proteins Normally Insoluble at pH 4 to 6—Verne D. Littlefield, Beverly Hills, Calif., to Armour & Co., Chicago, Ill. No. 2,168,926. Aug. 8, 1939.

Glycerine Added to an Ice Cream, Milk Solids, and Flavoring Mixture to Maintain a Semi-Liquid Consistency at Temperatures Used for Ice Cream Storage—Robert H. Haskins and Robert H. Haskins, Jr., Providence, R. I. No. 2,168,934. Aug. 8, 1939.

Starch Converted to Sugar Mixture Containing Between 65 and 70 Per Cent Dextrose Equivalent by Use of Molybdenum Catalyst—David P. Langlois, to A. E. Staley Mfg. Co., Decatur, Ill. No. 2,169,051. Aug. 8, 1939.

Milk and Similar Liquid Foods Brought to Desired Temperatures by Means of Vertical Type Heat Exchanger Arranged in Plural Units Which Swing Sidewise to Aid in Cleaning—Julius J. Mojonnier, Oak Park, Ill., to Mojonnier Bros. Co., Chicago, Ill. No. 2,169,054. Aug. 8, 1939.

Fresh Meats Protected Against Surface Spoilage by Ultra Violet Rays While Held at 55 Deg. F. to Speed up Internal Enzyme Changes—Robert F. James, Mahwah, N. J., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. No. 2,169,081. Aug. 8, 1939.

Vitamin A. Separated From Animal Oil by Molecular Distillation—Kenneth C. D. Hickman and Arthur O. Tischer, Rochester, N. Y., to Distillation Products, Inc., Rochester, N. Y. No. 2,169,195. Aug. 8, 1939.

Butter Flavor for Chocolate and Other Foods Obtained by Lipolysis of Butter Fat-Containing Aqueous Material—Herbert E. Otting, Westerville, Ohio, to M. & R. Dietetic Laboratories, Inc. No. 2,169,278. Aug. 15, 1939.

Glacé Fruit Made in a Continuous Process Manner—Charles Lachman, to S & W Fine Foods Inc., San Francisco, Calif. No. 2,169,362. Aug. 15, 1939.

Citrus Fruit Rinds Reduced in Oil Content Preparatory to Extraction of Juice From Fruit—John Mills, Winter Haven, Fla., to Crown Can Co., Philadelphia, Pa. No. 2,169,367. Aug. 15, 1939.

Sausages Stuffed Into Casings Along With Vegetable Parchment, Trade-Mark Identifying Tape—Alpheus J. Freeman to Freeman Inc., Chicago, Ill. Nos. 2,169,412 and 2,169,413. Aug. 15, 1939.

Milk and Similar Liquids Mechanically Filled and Sealed in Cartons Having a Thin Flexible Wall Bag Liner—Clarence W. Vogt, New York, N. Y., to Owens Illinois Glass Co., Toledo, Ohio. No. 2,169,573. Aug. 15, 1939.

Cooked Cereal Products Consisting of Particles Bonded Together by an Edible Solid Fat—Albert Musher, to Musher Corp., Elizabeth, N. J. No. 2,170,155. Aug. 22, 1939.

Creamed Soups Sterilized and Canned Without Coagulation of Milk Content or Impairment of Flavor by Driving Materials Through Small Passages Under Steam Jet Pressure at Temperatures Ranging from 260 to 280 Deg. F.—George Grindrod, Oconomowoc, Wis. Nos. 2,170,195 and 2,170,196. Aug. 22, 1939.

Starch Given Thin Boiling Properties by a Water Soluble Acid Salt of an Amide—James F. Walsh, Chicago, Ill., and Willard L. Morgan, Cranston, R. I., to American Maize-Products Company. No. 2,170,271. Aug. 22, 1939.

Starch Converted to Paste Having Relatively High Starch Solid Content with Relatively Low Consistency Through Use of a Relatively Strong Solid Acid Salt of an Amino Acid—James F. Walsh, Chicago, Ill., and Willard L. Morgan, Cranston, R. I., to American Maize Products Co. No. 2,170,272. Aug. 22, 1939.

Baking Powder Made to Contain an Acid Constituent Represented by the Formula $C_6H_5(PO_3)_2X$ in which X may be Hydrogen, an Alkali Metal, or an Alkaline Earth Metal—Willard L. Morgan, Calumet City, Ill., to American Maize Products Co. No. 2,170,274. Aug. 22, 1939.

Salad Dressing Base Made of Milk, Starch, Small Quantity of Hydrophillic Colloid and an Acid Such as Acetic, Lactic or Citric—Harry M. Levin, Philadelphia, Pa. No. 2,170,417. Aug. 22, 1939.

Salad Dressing Base, Non-Aqueous and Non-Emulsion-Like in Character, Made From Spices Normally Used in Salad Dressings and an Emulsifying Agent—Albert Musher, New York, N. Y., to Musher Corp., Elizabeth, N. J. No. 2,170,518. Aug. 22, 1939.

Potato Slices Propelled Through Deep Fat Cooking Vat at Predetermined Rate by Mechanical Means—Joseph D. Ferry, Harrisburg, Pa.; Sylvia O. Ferry, executrix. No. 2,170,775. Aug. 22, 1939.

Cellular Carotinoid Materials Macerated and Digested at 212 Deg. F. Under Pressure Preliminary to Solvent Extraction—David D. Peebles, Eureka, Calif. No. 2,170,872. Aug. 29, 1939.

Fondant for Cold Process Confections Made by Beating Finely Divided Dextrose Hydrate Crystals Into a Saturated Dextrose Syrup Containing an Edible Colloid—Theodore J. Otterbacher, Zion City, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,171,244. Aug. 29, 1939.

Sausage Binder Made From 3 to 40 Parts of Blood Serum, 97 to 60 Parts of Milk and 0 to 25 Parts of Vegetable Gum—Carroll L. Griffith and Lloyd A. Hall to Griffith Laboratories, Inc., Chicago, Ill. No. 2,171,428. Aug. 29, 1939.

Animal Casings Defatted by Melting Fat Upon Surface of Hardened Casing and Running Casing Through Rollers Under Pressures—Lucius M. Tolman and Lloyd E. Dimond, to Wilson & Co., Chicago, Ill. Nos. 2,171,611 and 2,171,612. Sept. 5, 1939.

Container for Liquids Made With a Rectangular Casing and an Inner Liquid-Tight, Flexible Liner Closed by Heat Sealing and Designed to Have Pouring Lip When Open—Clarence W. Vogt, New York, N. Y., to Owens Illinois Glass Co., Toledo, Ohio. Nos. 2,171,717 and 2,171,718. Sept. 5, 1939.

Starch Having Moisture Content of 25 to 55 Per Cent and Containing a Small Quantity of an Alkaline Salt Run Through Heated Rolls Under Pressure to Form Products Having a Soluble Content of 30 to 65 Per cent—Alfred H. Kelling, Oak Park, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,171,796. Sept. 5, 1939.

Freshly Baked Bakery Products Tempered and Cooled in Vacuum Chamber—Montague H. Duval, Great Neck, N. Y., and Ralph Vezin, Montclair, N. J. Nos. 2,171,921 and 2,171,922. Sept. 5, 1939.

Chewing Gum Mass Shaped Into a Traveling Strand and Sweetened in a Continuous Manner—Jacob Warren Bowman, Philadelphia, Pa., to William Steell Jackson & Son, Philadelphia, Pa. No. 2,171,960. Sept. 5, 1939.

Foods Dehydrated in a Closed System Equipped With a Pre-Heating and Sterilizing Unit for the Food and a Re-Heating Unit for the Recirculated Air—Forrest S. Chilton, Pompton Plains, N. J. No. 2,172,059. Sept. 5, 1939.

Pie Crusts and High Fat Cookies Given Well-Baked Color and Decreased Moisture Absorption Property by Use of Dried Starch-Conversion Sirup With 30 to 60 Per Cent Sugar Content Calculated as Dextrose—Robert L. Lloyd, Laurelton, N. J., to American Maize Products Co. No. 2,172,211. Sept. 5, 1939.

Bread Dough Made Into Twisted Loaf Form by Mechanical Means—Frederic Langtry van Allen, Winnipeg, Manitoba; 22½ per cent to Ambrose Paoli, 22½ per cent to Clifford N. Lush, and 20 per cent to Cecil C. Kent, Winnipeg, Manitoba, Canada. No. 2,172,268. Sept. 5, 1939.

Coated Confections Conveyed Through Cooling Tunnel, on Belt Made of Silk Fabric Impregnated With Synthetic Resin—Jack T. Berry, to Main Belting Co., Philadelphia, Pa. No. 2,172,341. Sept 12, 1939.

Whey Dried to 92 Per cent Solids in From 1 to 2 Min. After Preconcentrating to 65 Per Cent Solids—Charles O. Lavett, to Buffalo Foundry & Machine Co., Buffalo, N. Y. No. 2,172,393. Sept. 12, 1939.

Fruits and Vegetables Washed in Refrigerant Solution Used in Direct Contact Freezing Operations—Robert B. Taylor, Knoxville, Tenn., to Tennessee Valley Authority, Wilson Dam, Ala. No. 2,172,417. Sept. 12, 1939.

Foods Frozen by Direct Contact With Refrigerant Freed From Excess Solution by Centrifugal Force—Robert B. Taylor, Knoxville, Tenn., to Tennessee Valley Authority, Wilson Dam, Ala. No. 2,172,418. Sept. 12, 1939.

Fish Freed From Scales by Rotary Mechanical Means—Maurice W. Grow, Cleveland, Ohio, and John G. Volp, Lakewood, Ohio, to Grow Bros., Cleveland, Ohio. No. 2,172,470. Sept. 12, 1939.

Fish Freed From Scales by Force of Liquid Under Pressure—Walter D. Grow, to Grow Bros., Painesville, Ohio. Nos. 2,172,471 and 2,172,472. Sept. 12, 1939.

Coffee Electrically Roasted and Cooled in a Self-Contained Unit—Donald W. Adams and Richard L. Schuhmann, Louisville, Ky., to Coffee Electrost Corp., Chicago, Ill. No. 2,172,603. Sept. 12, 1939.

High Fat Seeds Put Into Flake Form by Soaking With Water, Pressing Into Thin Skin-Like Films by Passage Through Narrow Gap Between Heated Revolving Surfaces and Holding Against Heated Surface Until Dry—Martin Cohn, Berlin-Friedenau, Germany. No. 2,172,699. Sept. 12, 1939.

Cheese Surfaces Made Impervious to Mold Growth and Loss of Water and Fat by Dipping in an Alkaline Solution at 190 Deg. F. and Drying the Alkali Caseinate Coating Formed—Ronald Wood, Chicago, Ill. No. 2,172,781. Sept. 12, 1939.

Crackers, Biscuits and the Like Made in a Continuous Manner From Extruded Dough—Allen B. Holtzman and David Schell, Myerstown, Pa., to Holtzman's Inc. No. 2,173,000. Sept. 12, 1939.

Starch Made Soluble by Heating in Presence of Water and Persulphate—Josef Muller, Weissenstein-on-the-Drau, Carinthia, Austria. No. 2,173,041. Sept. 12, 1939.

Confection Making Materials Aerated and Frozen to Make a Relatively Dry Mass, Placed in Mold, and Compressed Into a Compact Molded Body to be Coated—Edwin J. Lockwood, Peekskill, N. Y., to Borden Company, New York, N. Y. No. 2,173,850. Sept. 26, 1939.

Meat Cured by Subjection to Actinic Rays From Quartz Mercury Vapor Lamp and Treating With Modified Salts—Hugh E. Allen, one-half to Albert G. McCaleb, Evanston, Ill. No. 2,173,992. Sept. 26, 1939.

Plastic Vegetable Oil Shortening Finished by Tempering to 25 to 30 Deg. C. and Agitating the Creamy Viscous Mass to Incorporate Air—Truman M. Godfrey, Winchester, Mass., and Victor Serbell, Leonia, N. J., to Level Bros. Co. No. 2,174,364. Sept. 26, 1939.

Plastic Shortening Made From Oils and Fats of Different Melting Points Stabilized as to Plasticity by Addition of 0.5 to 5.0 Per Cent of Hard Fat Having a Titer of Not Less Than 65 Deg. C.—Arne Gudheim, Leonia, N. J., to Lever Bros. Co. No. 2,174,365. Sept. 26, 1939.